

# TEST REPORT

Product Name: Aspire 3  
FCC ID: 2AMY3-A32451  
Trademark: N/A  
Model Number: A324-51, A324-53  
Prepared For: Acer India Pvt Ltd.  
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Manufacturer: Acer India Pvt Ltd.  
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Sample Received Date: Apr. 09, 2024  
Sample tested Date: Apr. 09, 2024 to Apr. 26, 2024  
Issue Date: Apr. 26, 2024  
Report No.: CTB240426073RFX  
Test Standards: FCC CFR Title 47 Part 15 Subpart E Section 15.407  
Test Results: PASS  
Remark: This is WIFI-5GHz band radio test report.

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Bin Mei / Director

Note: If there is any objection to the inspection results in this report, please submit a written report to the company within 15 days from the date of receiving the report. The test report is effective only with both signature and specialized stamp. This result(s) shown in this report refer only to the sample(s) tested. Without written approval of Shenzhen CTB Testing Technology Co., Ltd. this report can't be reproduced except in full. The tested sample(s) and the sample information are provided by the client. "\*" indicates the testing items were fulfilled by subcontracted lab. "#" indicates the items are not in CNAS accreditation scope.

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*(NOTE: N/A MEANS NOT APPLICABLE)*

1. VERSION

Report No.	Issue Date	Description	Approved
CTB240426073RFX	Apr. 26, 2024	Original	Valid



## 2. TEST SUMMARY

The Product has been tested according to the following specifications:

Test Item	Test Requirement	Test method	Result
<b>AC Power Line Conducted Emission</b>	47 CFR Part 15 Subpart E Section 15.407 (b)(6)	ANSI C63.10-2013	PASS
<b>Radiated Spurious emissions</b>	47 CFR Part 15 Subpart E Section 15.205/15.407(b)	KDB789033	PASS
<b>Band edge</b>	47 CFR Part 15 Subpart E Section 15.205/15.407(b)	KDB789033	PASS
<b>Conducted Peak Output Power</b>	47 CFR Part 15 Subpart E Section 15.407 (a)	KDB789033	PASS
<b>Emission Bandwidth &amp; Occupied Bandwidth</b>	47 CFR Part 15 Subpart E Section 15.407 (a)(e)	KDB789033	PASS
<b>Power Spectral Density</b>	47 CFR Part 15 Subpart E Section 15.407 (a)	KDB789033	PASS
<b>Frequency stability</b>	47 CFR Part 15 Subpart E Section 15.407 (g)	KDB789033	PASS
<b>Operation in the absence of information to the transmit</b>	47 CFR Part 15 Subpart E Section 15.407 (b)	47 CFR Part 15 Subpart E	PASS
<b>Antenna Requirement</b>	47 CFR Part 15 Subpart E Section 15.203	/	PASS

Remark:  
Test according to ANSI C63.10-2013.

### 3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Item	Uncertainty
Occupancy bandwidth	U=±54.3Hz
Adjacent channel power	U=±1.3dB
Conducted Adjacent channel power	U=±1.38dB
Conducted output power Above 1G	U=±1.0dB
Conducted output power below 1G	U=±0.9dB
Power Spectral Density , Conduction	U=±1.0dB
Conduction spurious emissions	U=±2.8dB
Out of band emission	U=±54Hz
3m camber Radiated spurious emission(9KHz-30MHz)	U=±4.8dB
3m camber Radiated spurious emission(30MHz-1GHz)	U=±4.3dB
3m chamber Radiated spurious emission(1GHz-18GHz)	U=±4.5dB
3m chamber Radiated spurious emission(18GHz-40GHz)	U=±3.4dB
humidity uncertainty	U=±5.3%
Temperature uncertainty	U=±0.59°C
Supply voltages	U=±3%
Time	U=±5%
Conducted emission(150K-30MHz)	3.2dB

#### 4. PRODUCT INFORMATION AND TEST SETUP

##### 4.1 Product Information

Model(s):	A324-51, A324-53
Model Description:	All the model are the same circuit and RF module, only different for model name. Test sample model: A324-51
Wi-Fi Specification:	IEEE 802.11a/b/g/n/ac/ax
Hardware Version:	V1.0
Software Version:	V1.0
Operation Frequency:	IEEE 802.11a/n/ac/ax(20M): 5150MHz ~5250MHz/ 4 channel IEEE 802.11n/ac/ax(40M): 5150MHz ~5250MHz/ 2 channel IEEE 802.11ac/ax(80M): 5150MHz ~5250MHz/ 1 channel  IEEE 802.11a/n/ac/ax(20M): 5725MHz ~5850MHz/ 5 channel IEEE 802.11n/ac/ax(40M): 5725MHz ~5850MHz/ 2 channel IEEE 802.11ac/ax(80M): 5725MHz ~5850MHz/ 1 channel
Max. RF output power:	WiFi (5G): 17.148dBm
Type of Modulation:	WiFi: OFDM
Antenna installation:	WiFi: FPC antenna
Antenna Gain:	WiFi (5.2G): Ant1: 3.94dBi Ant2: 3.94dBi WiFi (5.8G): Ant1: 5.17dBi Ant2: 5.17dBi
Ratings:	Adapter: Input: 100-240V~50/60Hz 1.5A Output: 12V $\overline{\text{---}}$ 3000mA DC 7.6V by battery

#### 4.2 Test Setup Configuration

See test photographs attached in EUT TEST SETUP PHOTOGRAPHS for the actual connections between Product and support equipment.

#### 4.3 Support Equipment

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
1	PC	DELL	Inspiron 3670	N/A	N/A

#### Notes:

- All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
- Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

#### 4.4 Channel List

For 802.11a/n/ac/ax( 20M) Operation in the 5180MHz ~5240 MHz band			
Channel	Frequency	Channel	Frequency
36	5180MHz	44	5220MHz
40	5200MHz	48	5240MHz
For 802.11a/n/ac/ax( 20M) Operation in the 5745MHz ~5825 MHz band			
Channel	Frequency	Channel	Frequency
149	5745MHz	161	5805MHz
153	5765MHz	165	5825MHz
157	5785MHz	NA	NA

For 802.11n/ac/ax(40M) Operation in the 5190MHz ~5230 MHz band			
Channel	Frequency	Channel	Frequency
38	5190MHz	46	5230MHz
For 802.11n/ac/ax(40M) Operation in the 5755MHz ~5795 MHz band			
Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

For 802.11ac/ax(80M) Operation in the 5210 MHz band			
Channel	Frequency	Channel	Frequency
42	5210MHz	NA	NA
For 802.11ac/ax(80M) Operation in the 5775 MHz band			
Channel	Frequency	Channel	Frequency
155	5775MHz	NA	NA

NOTE: Dutycycle>98%.

Test mode	rate
802.11a	54M
802.11n	500M
802.11/ac/ax	500M



#### 4.5 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

Test Mode	Tx/Rx	RF Channel		
		Low(L)	Middle(M)	High(H)
802.11a/n/ac/ax(20M)	5180MHz ~5240 MHz	Channel 36	Channel 40	Channel 48
		5180MHz	5200MHz	5240MHz
Channel 38		N/A	Channel 46	
5190MHz		N/A	5230MHz	
N/A		Channel 42	N/A	
N/A		5210MHz	N/A	
802.11a/n/ac/ax(20M)	5745MHz ~5825MHz	Channel 149	Channel 157	Channel 165
5745MHz		5785MHz	5825MHz	
Channel 151		N/A	Channel 159	
5755MHz		N/A	5795MHz	
N/A		Channel 155	N/A	
N/A		5775MHz	N/A	

#### 4.6 Test Environment

Humidity(%):	54
Atmospheric Pressure(kPa):	101
Normal Voltage(DC):NV	7.6V
Normal Temperature(°C):NT	23
Low Temperature(°C):LT	0
High Temperature(°C):HT	40



## 5. TEST FACILITY AND TEST INSTRUMENT USED

### 5.1 Test Facility

All measurement facilities used to collect the measurement data are located at 1&2F., Building A, No. 26, Xinh Road, Xinqiao, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards.

### 5.2 Test Instrument Used

Item	Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	Agilent	N9020A	MY52090073	2024.07.05
2	Power Sensor	Agilent	U2021XA	MY56120032	2024.07.05
3	Power Sensor	Agilent	U2021XA	MY56120034	2024.07.05
4	Communication test set	R&S	CMW500	108058	2024.07.05
5	Spectrum Analyzer	KEYSIGHT	N9020A	MY51289897	2024.07.05
6	Signal Generator	Agilent	N5181A	MY50140365	2024.07.05
7	Vector signal generator	Agilent	N5182A	MY47420195	2024.07.05
8	Communication test set	Agilent	E5515C	MY50102567	2024.07.06
9	2.4 GHz Filter	Shenxiang	MSF2400-2483.5MS-1154	20181015001	2024.07.05
10	5 GHz Filter	Shenxiang	MSF5150-5850 MS-1155	20181015001	2024.07.06
11	Filter	Xingbo	XBLBQ-DZA120	190821-1-1	2024.07.06
12	BT&WI-FI Automatic test software	Microwave	MTS8000	Ver. 2.0.0.0	/
13	Rohde & Schwarz SFU Broadcast Test System	R&S	SFU	101017	2024.10.30
14	Temperature humidity chamber	Hongjing	TH-80CH	DG-15174	2024.07.05
15	234G Automatic test software	Microwave	MTS8200	Ver. 2.0.0.0	/
16	966 chamber	C.R.T.	966	/	2024.08.11
17	Receiver	R&S	ESPI	100362	2024.07.05
18	Amplifier	HP	8447E	2945A02747	2024.07.05
19	Amplifier	Agilent	8449B	3008A01838	2024.07.05
20	TRILOG Broadband Antenna	Schwarzbeck	VULB 9168	00869	2024.07.08

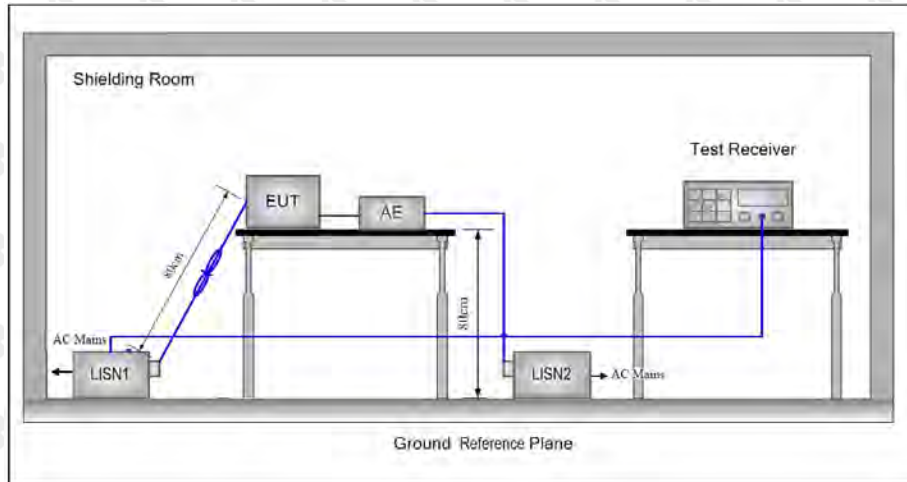
21	Double Ridged Broadband Horn Antenna	Schwarzbeck	BBHA9120D	01911	2024.07.08
22	EMI test software	Fala	EZ-EMC	FA-03A2 RE	/
23	Loop Antenna	Schwarzbeck	FMZB 1519B	1519B-224	2024.07.08
24	loop antenna	ZHINAN	ZN30900A	GTS534	/
25	40G Horn antenna	A/H/System	SAS-574	588	2024.10.30
26	Amplifier	AEROFLEX	Aeroflex	097	2024.07.05

Continuous disturbance					
No.	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	LISN	ROHDE&SCHWARZ	ESH3-Z5	100318	2024.07.05
2	Pulse limiter	ROHDE&SCHWARZ	ESH3Z2	357881052	2024.07.05
3	EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI	100428/003	2024.07.05
4	Coaxial cable	ZDECL	Z302S-NJ-SMA J-12M	18091905	2024.07.05
5	ISN	Schwarzbeck	NTFM8158	183	2024.07.05
6	Communication test set	Agilent	E5515C	MY50102567	2024.07.05
7	Communication test set	R&S	CMW500	108058	2024.07.05
8	EZ-EMC	Frad	EMC-con3A1.1	/	/

Radiated emission					
No.	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	Double Ridged Broadband Horn Antenna	Schwarzbeck	BBHA 9120 D	01911	2024.07.08
2	TRILOG Broadband Antenna	Schwarzbeck	VULB 9168	00869	2024.07.08
3	Amplifier	Agilent	8449B	3008A01838	2024.07.05
4	Amplifier	HP	8447E	2945A02747	2024.07.05
5	EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI	100428/003	2024.07.05
6	Coaxial cable	ETS	RFC-SNS-100-NMS-80 NI	/	2024.07.05
7	Coaxial cable	ETS	RFC-SNS-100-NMS-20 NI	/	2024.07.05
8	Coaxial cable	ETS	RFC-SNS-100-SMS-20 NI	/	2024.07.05
9	Coaxial cable	ETS	RFC-NNS-100-NMS-300 NI	/	2024.07.05
10	Communication test set	Agilent	E5515C	MY50102567	2024.07.05
11	Communication test set	R&S	CMW500	108058	2024.07.05
12	EZ-EMC	Frad	EMC-con3A1.1	/	/

## 6. AC POWER LINE CONDUCTED EMISSION

### 6.1 Block Diagram Of Test Setup



### 6.2 Limit

Table 4 - AC power-line conducted emissions limits		
Frequency (MHz)	Conducted limit (dB $\mu$ V)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56 <sup>Note 1</sup>	56 to 46 <sup>Note 1</sup>
0.5 - 5	56	46
5 - 30	60	50

**Note 1:** The level decreases linearly with the logarithm of the frequency.

\* Decreasing linearly with the logarithm of the frequency

### 6.3 Test procedure

- 1) The mains terminal disturbance voltage test was conducted in a shielded room.
- 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50 $\Omega$ /50 $\mu$ H + 5 $\Omega$  linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
- 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
- 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0,4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0,8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane.



This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0,8 m from the LISN 2.

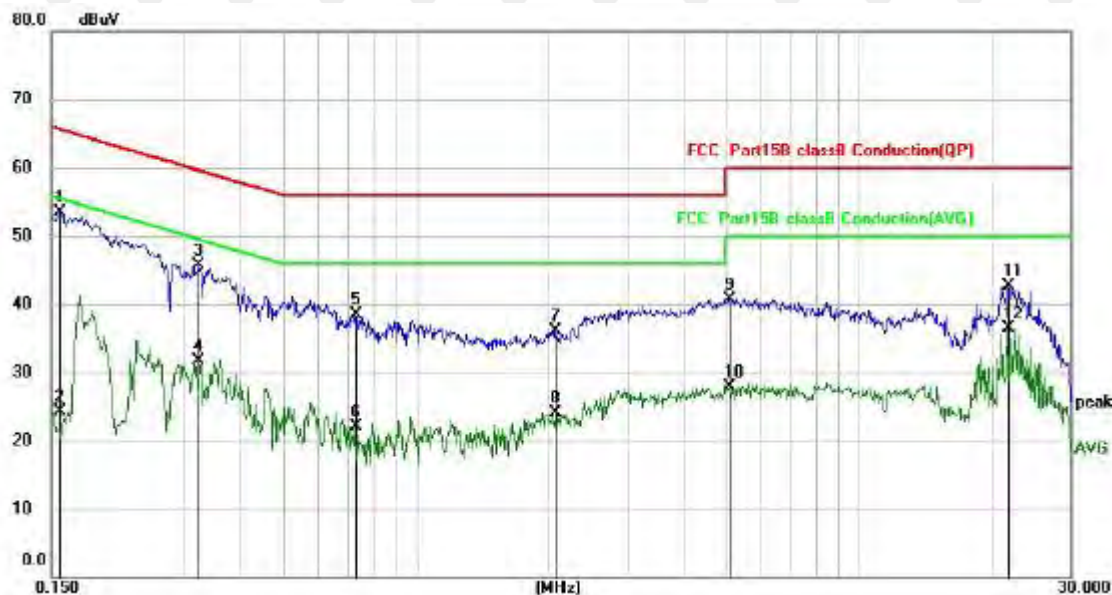
- 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.



### 6.4 Test Result

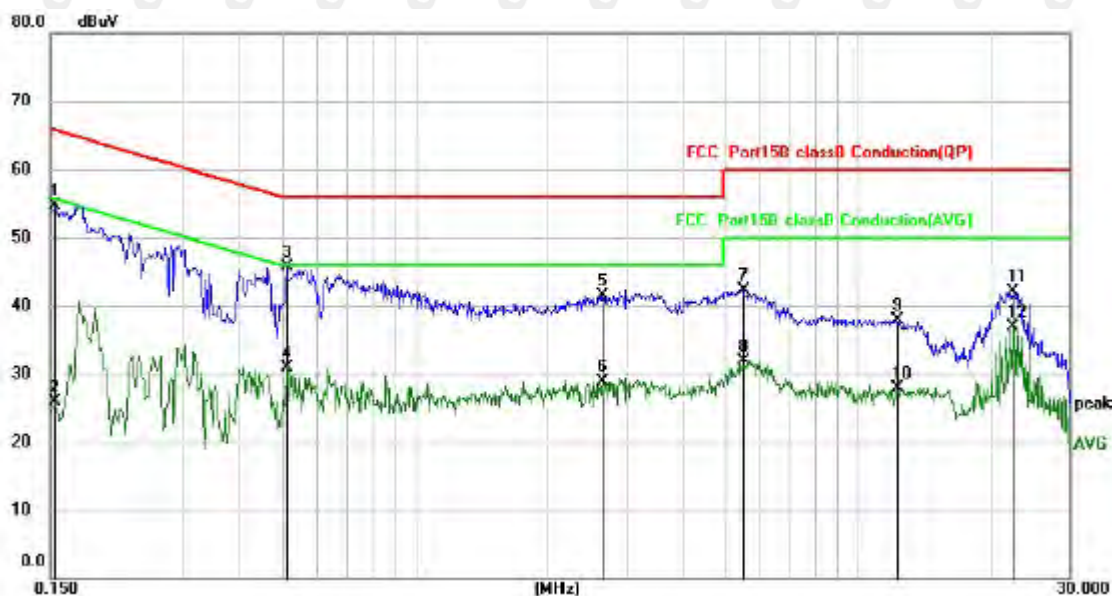
Modulation : 802.11a (the worst data)

L:



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measurement dBuV	Limit dBuV	Over dB	Detector
1	*	0.1565	43.48	9.95	53.43	65.65	-12.22	QP
2		0.1565	14.30	9.95	24.25	55.65	-31.40	AVG
3		0.3234	35.78	9.97	45.75	59.62	-13.87	QP
4		0.3234	21.68	9.97	31.65	49.62	-17.97	AVG
5		0.7300	28.43	10.02	38.45	56.00	-17.55	QP
6		0.7300	12.10	10.02	22.12	46.00	-23.88	AVG
7		2.0579	25.91	10.10	36.01	56.00	-19.99	QP
8		2.0579	13.98	10.10	24.08	46.00	-21.92	AVG
9		5.1059	30.38	10.39	40.77	60.00	-19.23	QP
10		5.1059	17.57	10.39	27.96	50.00	-22.04	AVG
11		21.6060	31.89	10.88	42.77	60.00	-17.23	QP
12		21.6060	25.53	10.88	36.41	50.00	-13.59	AVG

N:



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1		0.1539	44.66	9.95	54.61	65.79	-11.18	QP
2		0.1539	15.98	9.95	25.93	55.79	-29.86	AVG
3	*	0.5140	35.75	9.99	45.74	56.00	-10.26	QP
4		0.5140	21.01	9.99	31.00	46.00	-15.00	AVG
5		2.6419	31.44	10.15	41.59	56.00	-14.41	QP
6		2.6419	18.84	10.15	28.99	46.00	-17.01	AVG
7		5.5137	31.86	10.42	42.28	60.00	-17.72	QP
8		5.5137	21.54	10.42	31.96	50.00	-18.04	AVG
9		12.2217	27.30	10.65	37.95	60.00	-22.05	QP
10		12.2217	17.23	10.65	27.88	50.00	-22.12	AVG
11		22.3658	31.29	10.91	42.20	60.00	-17.80	QP
12		22.3658	26.02	10.91	36.93	50.00	-13.07	AVG

Remark:

- Factor = Cable loss + LISN factor, Margin = Limit – Level
- All modes were tested at AC 120V and 240V, only the worst result of AC 120V 60Hz was reported.
- All the test modes completed for test. Only the worst result of was reported.

## 7. RADIATED SPURIOUS EMISSIONS

### 7.1 Block Diagram Of Test Setup

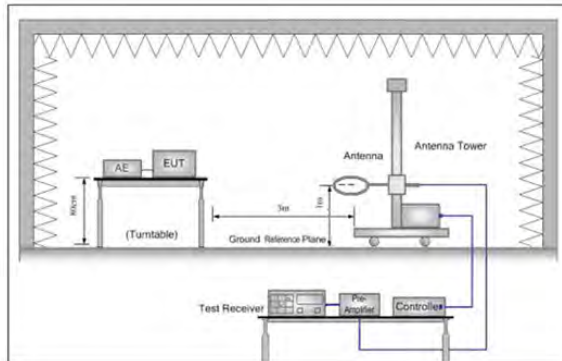


Figure 1. Below 30MHz

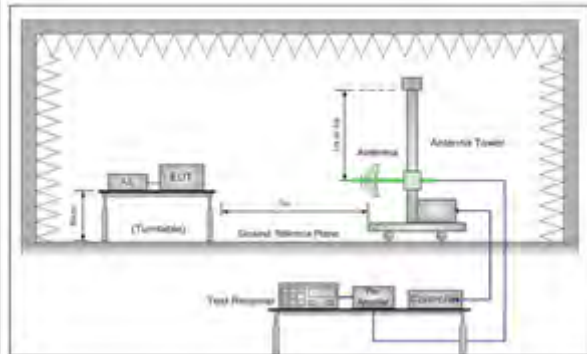


Figure 2. 30MHz to 1GHz

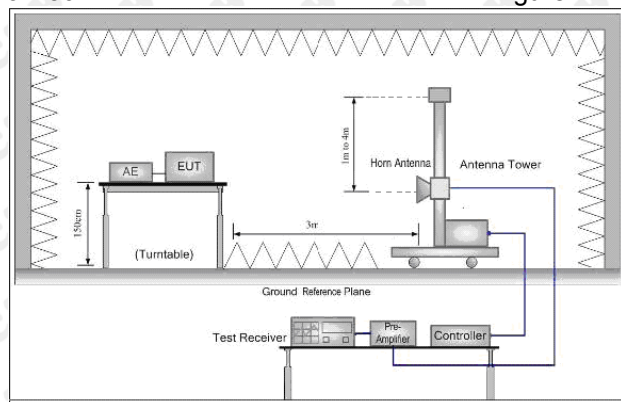


Figure 3. Above 1GHz

### 7.2 Limit

Spurious Emissions:

Frequency	Field strength (dB $\mu$ V/m)	Remark	Measurement distance (m)
0.009MHz-0.490MHz	$20\log 2400/F$ (kHz) + 80	Quasi-peak	3
0.490MHz-1.705MHz	$20\log 24000/F$ (kHz) + 40	Quasi-peak	3
1.705MHz-30MHz	$20\log 30$ + 40	Quasi-peak	3
30MHz-88MHz	40.0	Quasi-peak	3
88MHz-216MHz	43.5	Quasi-peak	3
216MHz-960MHz	46.0	Quasi-peak	3
960MHz-1GHz	54.0	Quasi-peak	3
Above 1GHz	54.0	Average	3

Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.



If radiated measurements are performed, field strength is then converted to EIRP as follows:

(i)  $EIRP = ((E*d)^2) / 30$

where:

- E is the field strength in V/m;
- d is the measurement distance in meters;
- EIRP is the equivalent isotropically radiated power in watts.

(ii) Working in dB units, the above equation is equivalent to:

$$EIRP[dBm] = E[dB\mu V/m] + 20 \log(d[meters]) - 104.77$$

(iii) Or, if d is 3 meters:

$$EIRP[dBm] = E[dB\mu V/m] - 95.2$$

### 7.3 Test procedure

#### Below 1GHz test procedure as below:

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rota table table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

#### Above 1GHz test procedure as below:

- g. Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 meter to 1.5 meter( Above 18GHz the distance is 1 meter and table is 1.5 meter).
- h. Test the EUT in the lowest channel ,the middle channel ,the Highest channel
- j. Repeat above procedures until all frequencies measured was complete.

Receiver set:

Frequency	Detector	RBW	VBW	Remark
0.009MHz-0.090MHz	Peak	10kHz	30KHz	Peak
0.009MHz-0.090MHz	Average	10kHz	30KHz	Average
0.090MHz-0.110MHz	Quasi-peak	10kHz	30KHz	Quasi-peak
0.110MHz-0.490MHz	Peak	10kHz	30KHz	Peak
0.110MHz-0.490MHz	Average	10kHz	30KHz	Average
0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
30MHz-1GHz	Quasi-peak	120 kHz	300KHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average



### 7.4 Test Result

30MHz-1GHz Test Results:  
 Modulation : 802.11a (the worst data)  
 Test Channel : 5780MHz  
 Antenna polarity: H



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Detector
1	!	43.7351	41.17	-5.47	35.70	40.00	-4.30	QP
2		62.6505	34.81	-7.08	27.73	40.00	-12.27	QP
3		108.8375	36.52	-7.26	29.26	43.50	-14.24	QP
4		149.2238	38.19	-3.26	34.93	43.50	-8.57	QP
5		298.2681	39.72	-4.81	34.91	46.00	-11.09	QP
6	*	401.8383	45.09	-2.11	42.98	46.00	-3.02	QP

Antenna polarity: V



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Detector
1		43.7351	33.55	-5.47	28.08	40.00	-11.92	QP
2		106.0126	31.96	-7.78	24.18	43.50	-19.32	QP
3		153.2000	37.52	-3.29	34.23	43.50	-9.27	QP
4		235.4028	39.28	-7.07	32.21	46.00	-13.79	QP
5		300.8942	43.36	-4.72	38.64	46.00	-7.36	QP
6	*	387.9917	45.20	-2.46	42.74	46.00	-3.26	QP

Remark: Factor = Cable lose + Antenna factor - Pre-amplifier; Margin = Limit – Level

## Radiated Spurious Emission ( Above 1GHz):

Modulation : 802.11(a) (the worst data)

Freq (MHz)	Rd_level (dBuV/m)	Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over (dB)	detector	Height	Degree	Antenna polarization
Channel:5180MHz									
10360	39.82	16.39	56.21	74	-17.79	PK	1.23	55	H
10360	26.85	16.39	43.24	54	-10.76	AV	1.27	281	H
10360	41.82	16.39	58.21	74	-15.79	PK	1.24	56	V
10360	27.80	16.39	44.19	54	-9.81	AV	1.58	23	V
Channel:5240MHz									
10480	39.82	16.11	55.93	74	-18.07	PK	1.73	98	H
10480	26.82	16.11	42.93	54	-11.07	AV	1.48	50	H
10480	41.24	16.11	57.35	74	-16.65	PK	1.44	100	V
10480	25.20	16.11	41.31	54	-12.69	AV	1.75	205	V
Channel:5745MHz									
11490	41.61	17.46	59.07	74	-14.93	PK	1.03	246	H
11490	26.10	17.46	43.56	54	-10.44	AV	1.79	249	H
11490	41.34	17.46	58.80	74	-15.20	PK	1.22	113	V
11490	26.68	17.46	44.14	54	-9.86	AV	1.56	172	V
Channel:5825MHz									
11650	40.91	17.57	58.48	74	-15.52	PK	1.53	59	H
11650	26.49	17.57	44.06	54	-9.94	AV	1.33	147	H
11650	41.44	17.57	59.01	74	-14.99	PK	1.04	75	V
11650	26.56	17.57	44.13	54	-9.87	AV	1.80	205	V

Modulation : 802.11(n40) (the worst data)

Freq (MHz)	Rd_level (dBuV/m)	Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over (dB)	detector	Height	Degree	Antenna polarization
Channel:5190MHz									
10380	41.18	16.34	57.52	74	-16.48	PK	1.64	221	H
10380	26.96	16.34	43.30	54	-10.70	AV	1.39	340	H
10380	40.24	16.34	56.58	74	-17.42	PK	1.46	22	V
10380	25.47	16.34	41.81	54	-12.19	AV	1.22	223	V
Channel:5230MHz									
10460	41.91	16.15	58.06	74	-15.94	PK	1.76	81	H
10460	26.40	16.15	42.55	54	-11.45	AV	1.41	127	H
10460	40.34	16.15	56.49	74	-17.51	PK	1.13	130	V
10460	25.97	16.15	42.12	54	-11.88	AV	1.26	45	V
Channel:5755MHz									
11510	39.50	17.49	56.99	74	-17.01	PK	1.11	247	H
11510	27.71	17.49	45.20	54	-8.80	AV	1.55	86	H
11510	41.69	17.49	59.18	74	-14.82	PK	1.17	349	V
11510	26.04	17.49	43.53	54	-10.47	AV	1.01	27	V
Channel:5795MHz									
11590	40.27	17.52	57.79	74	-17.50	PK	1.76	255	H
11590	25.77	17.52	43.29	54	-16.21	AV	1.56	94	H
11590	40.37	17.52	57.89	74	-16.11	PK	1.70	41	V
11590	26.18	17.52	43.70	54	-10.30	AV	1.52	216	V



Modulation : 802.11(VH80) (the worst data)

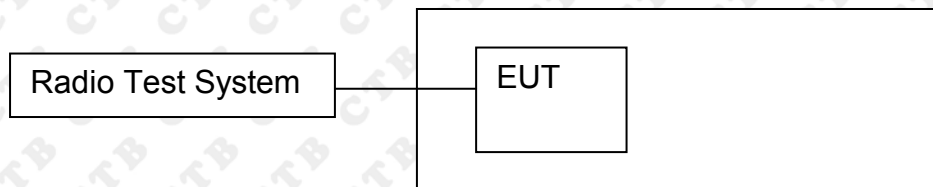
Freq (MHz)	Rd_level (dBuV/m)	Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over (dB)	detector	Height	Degree	Antenna polarization
Channel:5210MHz									
10420	40.25	16.25	56.50	74	-17.50	PK	1.02	338	H
10420	27.74	16.25	43.99	54	-10.01	AV	1.26	64	H
10420	41.30	16.25	57.55	74	-16.45	PK	1.78	14	V
10420	25.60	16.25	41.85	54	-12.15	AV	1.25	123	V
Channel:5775MHz									
11550	39.84	17.50	57.34	74	-16.66	PK	1.32	39	H
11550	25.52	17.50	43.02	54	-10.98	AV	1.30	201	H
11550	40.74	17.50	58.24	74	-15.76	PK	1.87	303	V
11550	26.11	17.50	43.61	54	-10.39	AV	1.42	34	V

## Remark:

- Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits
- The EUT was tested in the low, high channel and the worst case position data was reported.
- Testing is carried out with frequency rang 9kHz to the tenth harmonics, other than listed in the table above are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

## 8. BAND EDGE

### 8.1 Block Diagram Of Test Setup



### 8.2 Limit

- (1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of  $-27$  dBm/MHz.
- (2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of  $-27$  dBm/MHz.
- (3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of  $-27$  dBm/MHz.
- (4) For transmitters operating in the 5.725-5.85 GHz band: All emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of  $-17$  dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of  $-27$  dBm/MHz.
- (5) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.
- (6) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in §15.207.

### 8.3 Test procedure

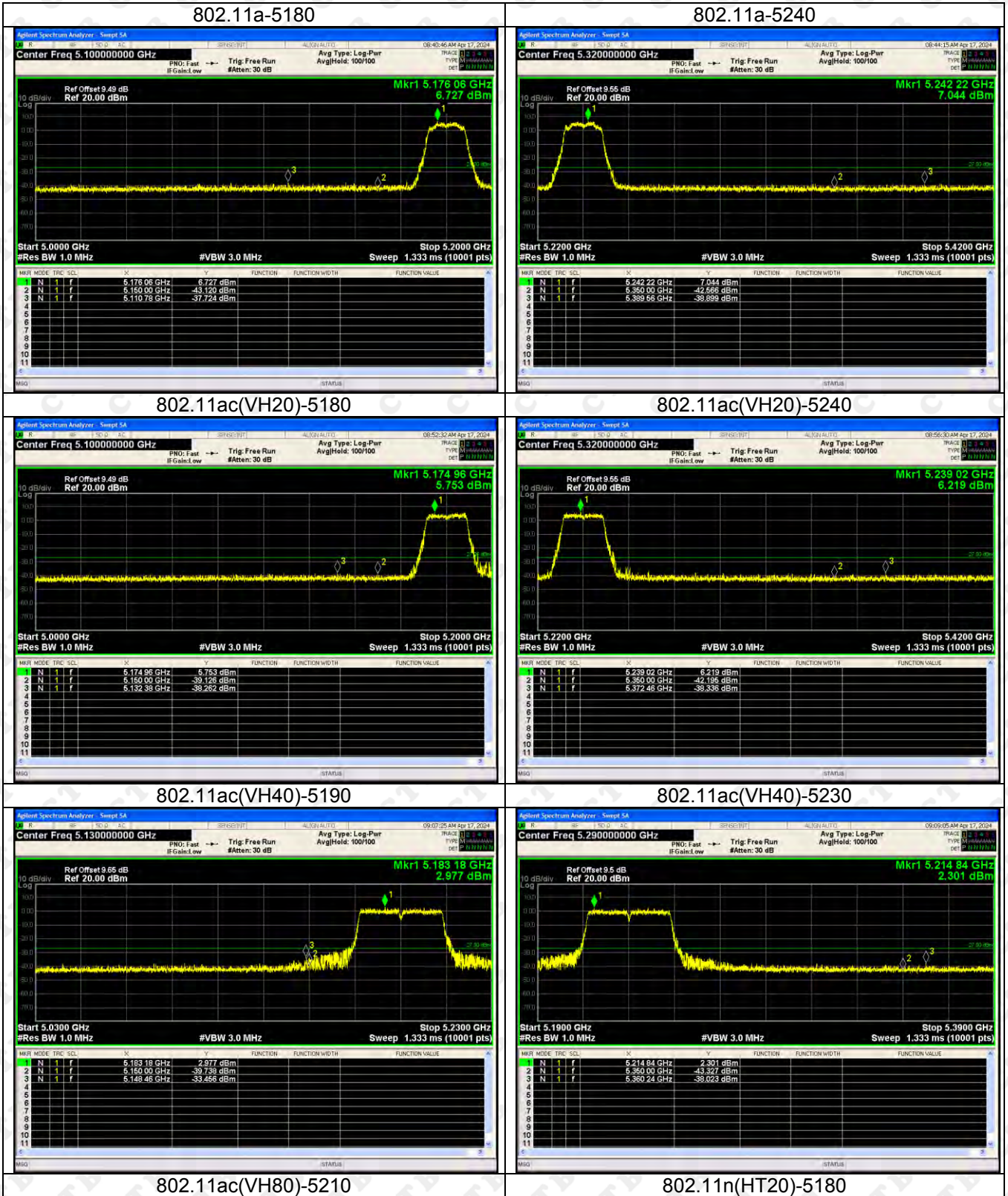
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW of spectrum analyzer to 1 MHz with a convenient frequency span.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.



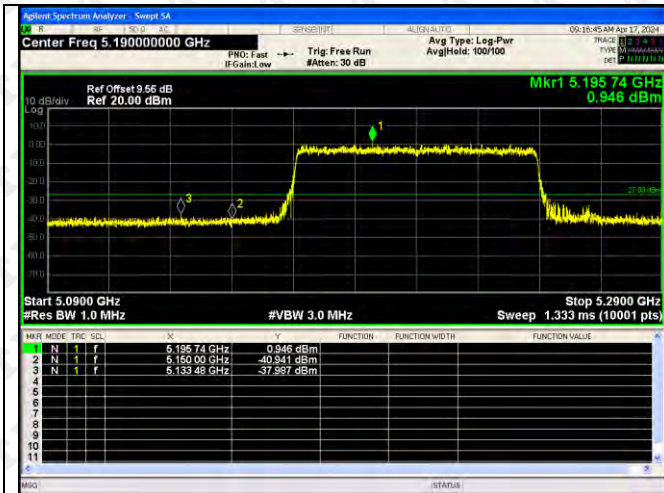
## 8.4 Test Result

### Test Graph

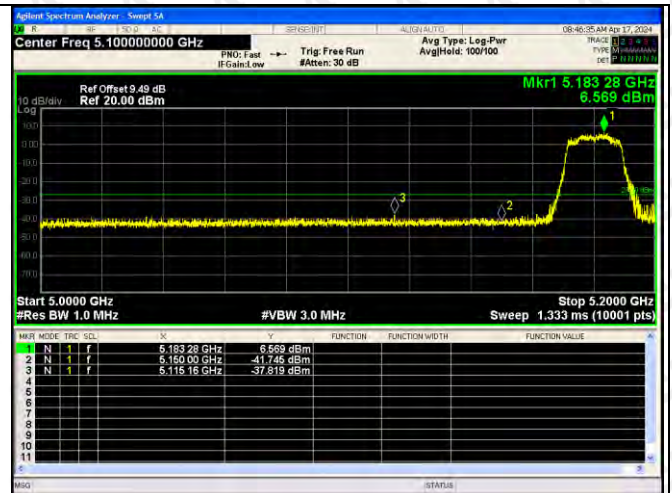
#### ANT 1



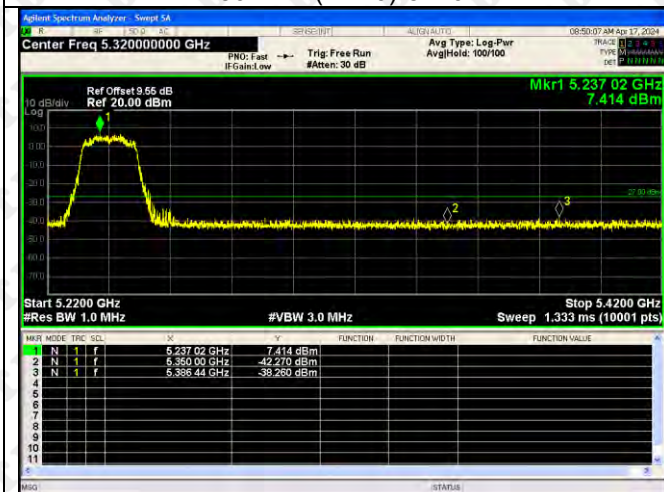




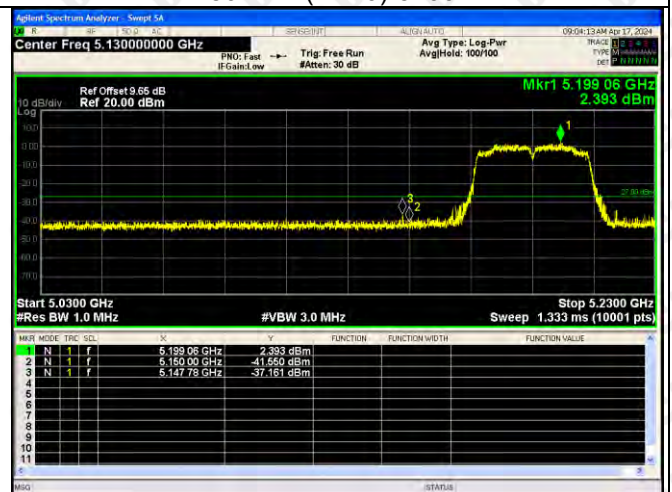
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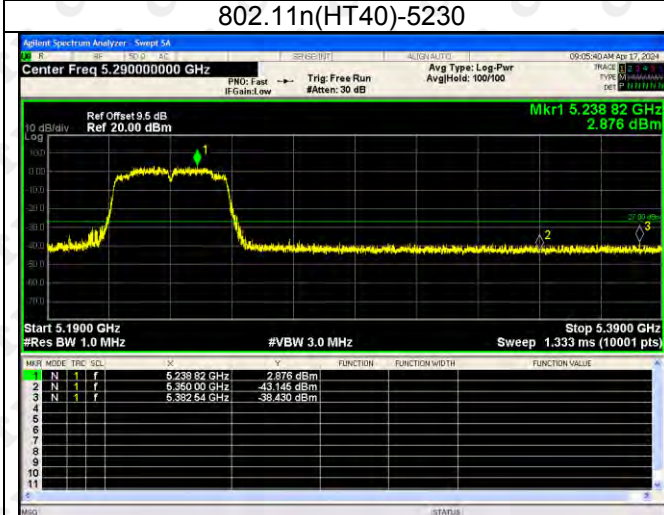
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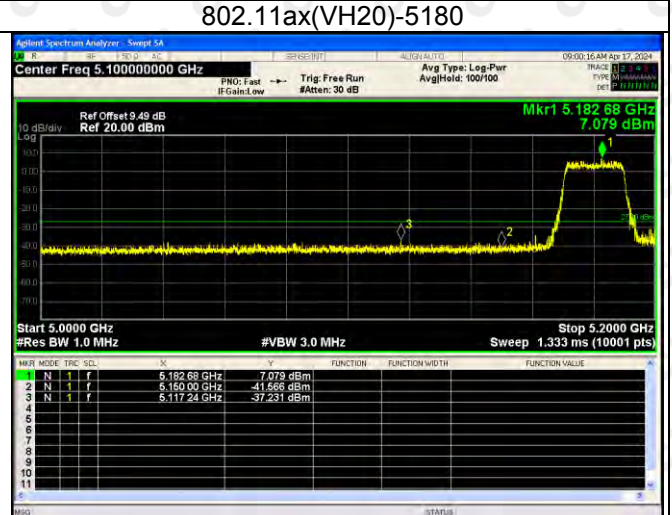
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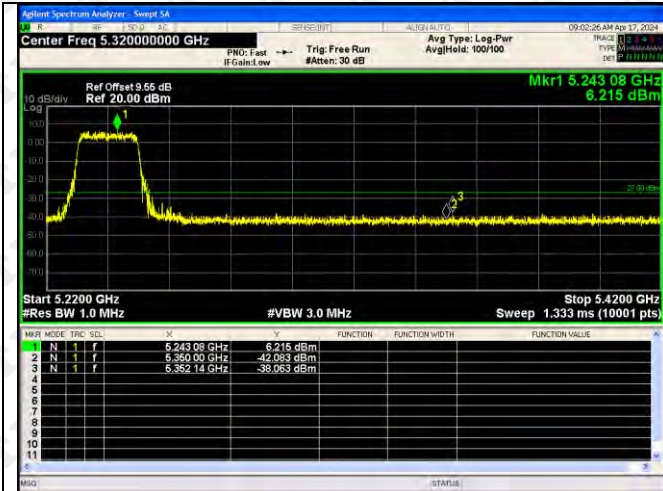
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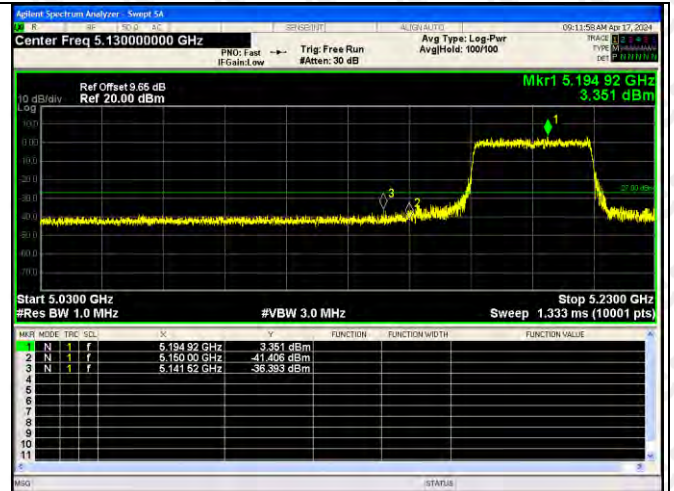
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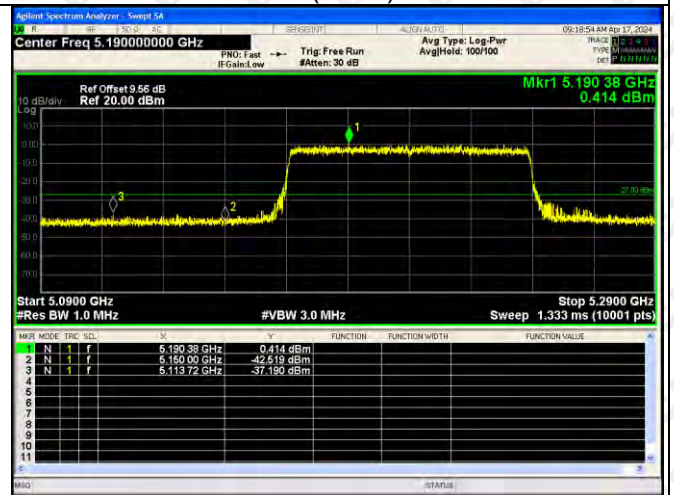
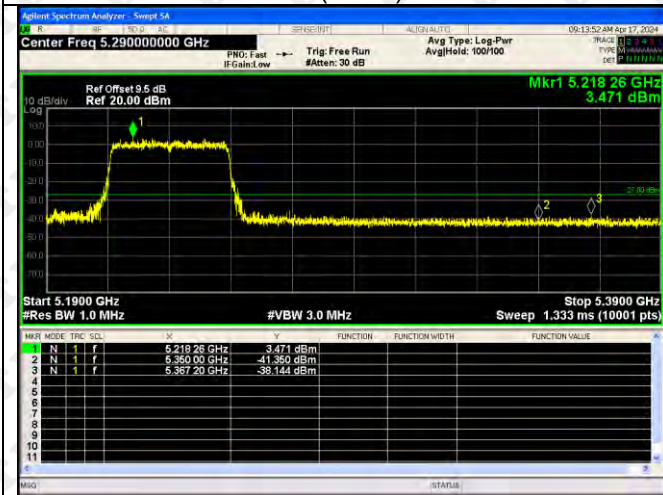
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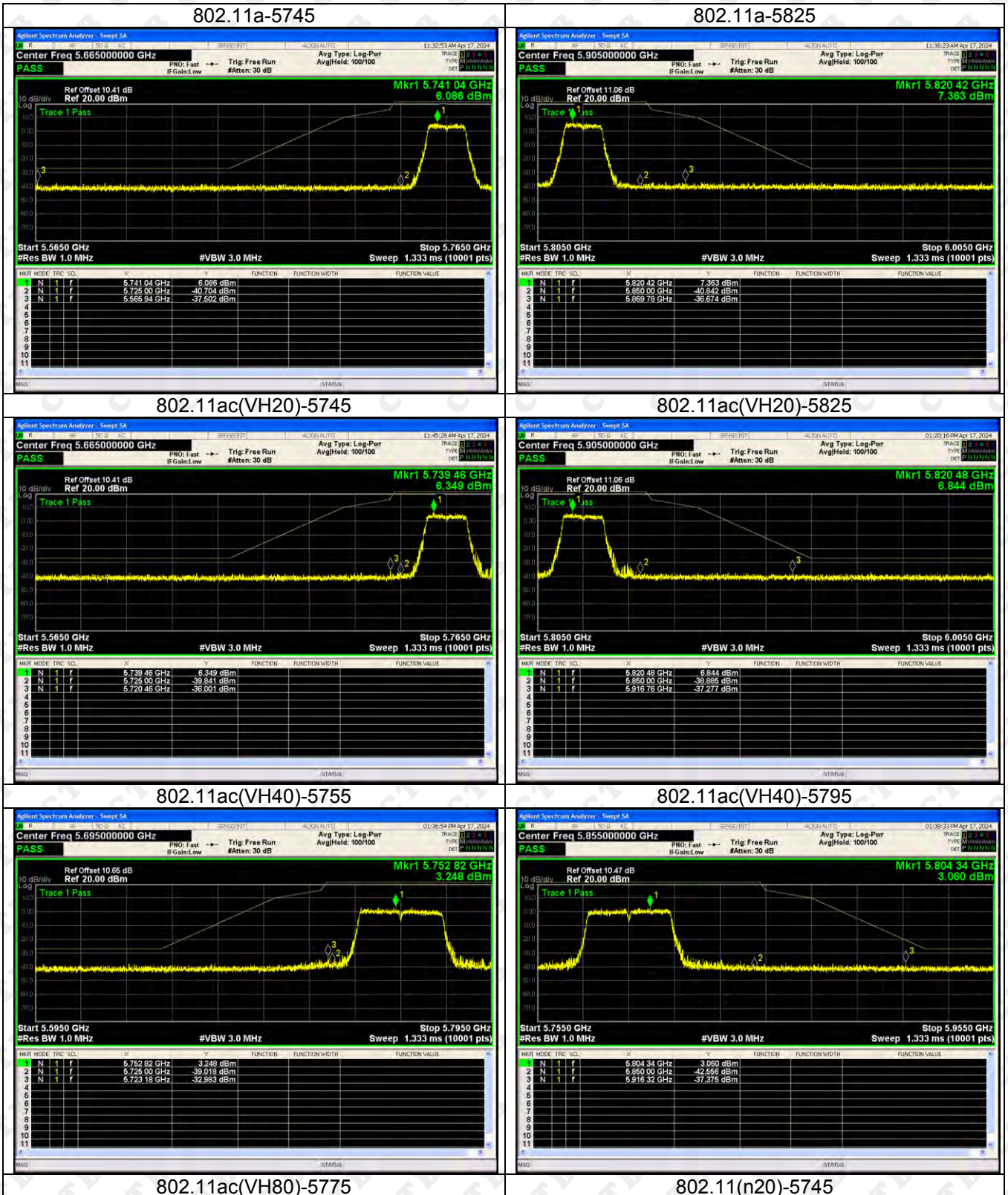


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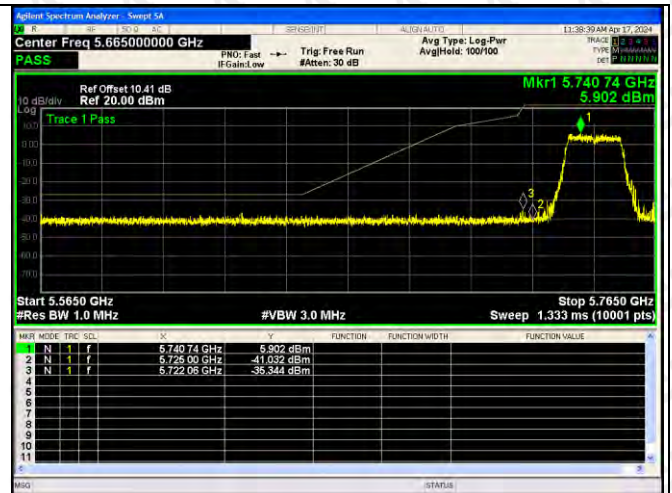
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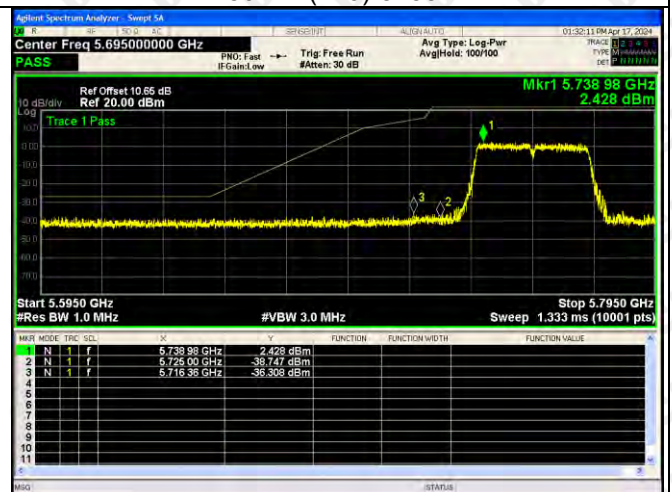
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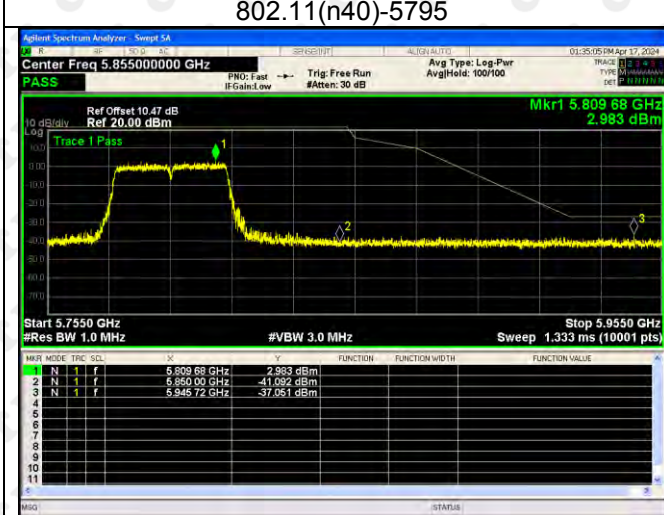
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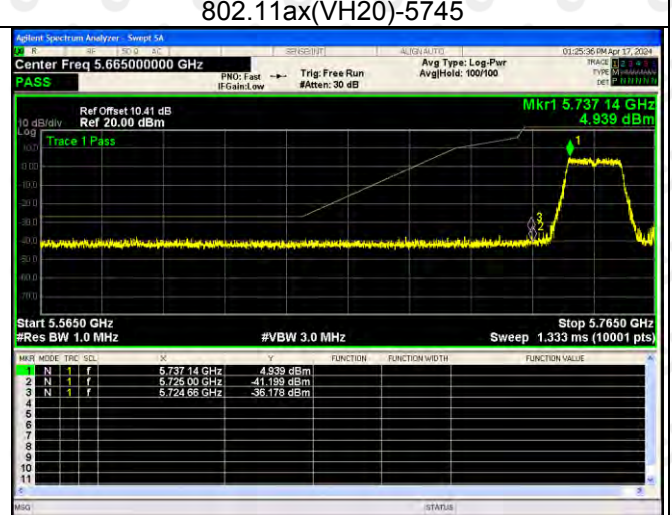
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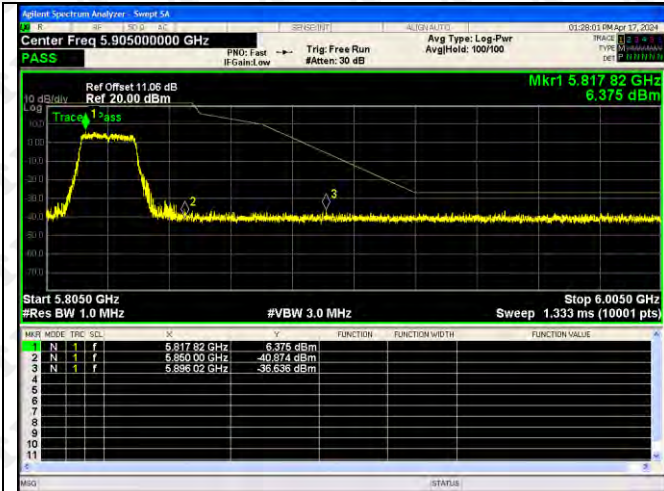
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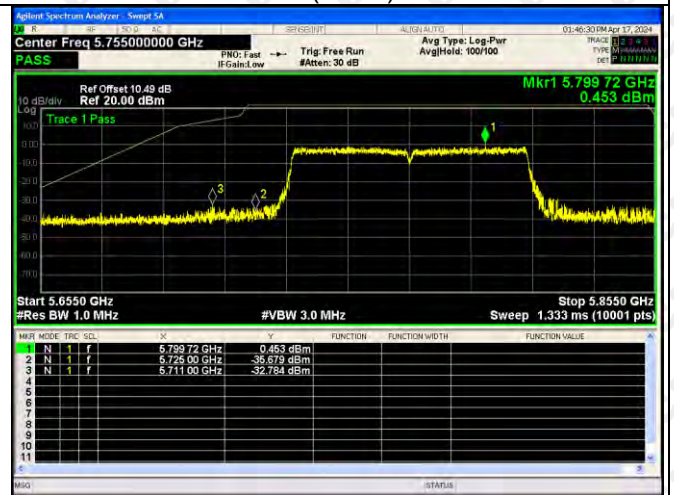
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802.11ax(VH40)-5795

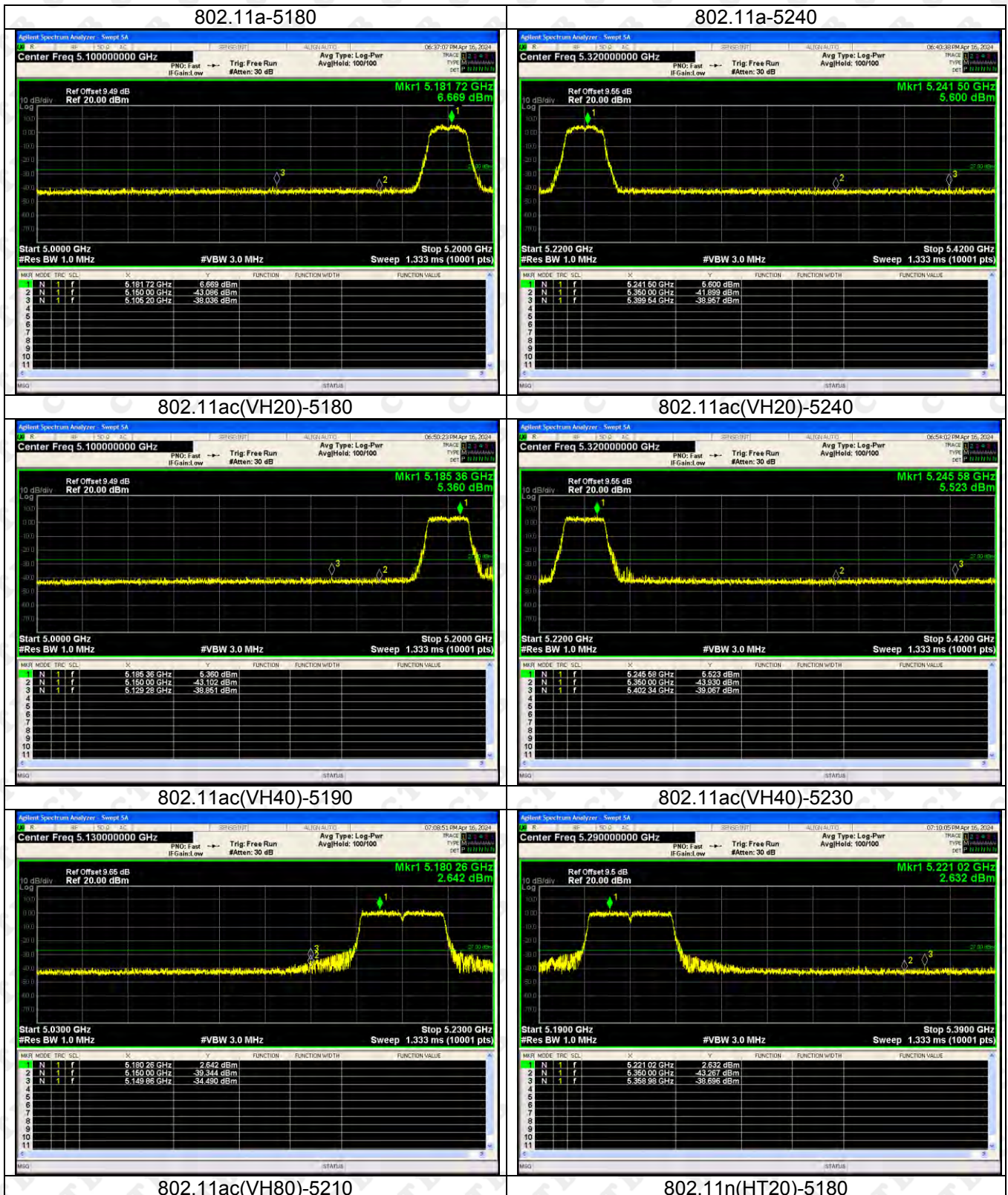


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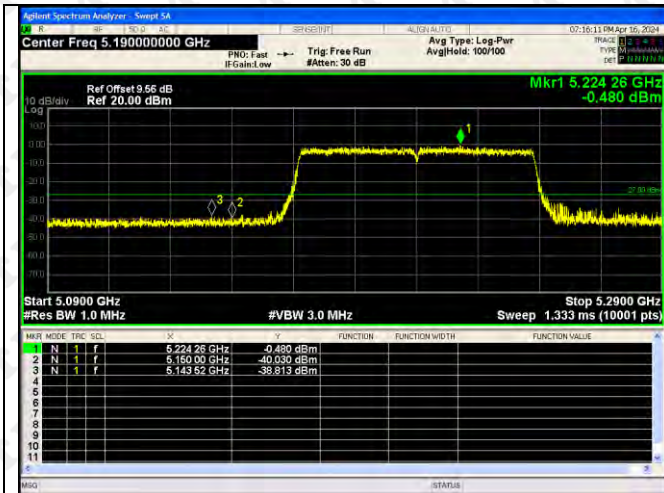




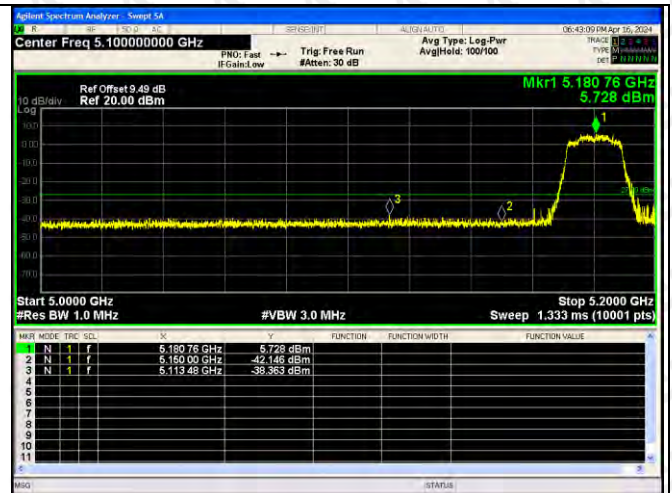
ANT 2



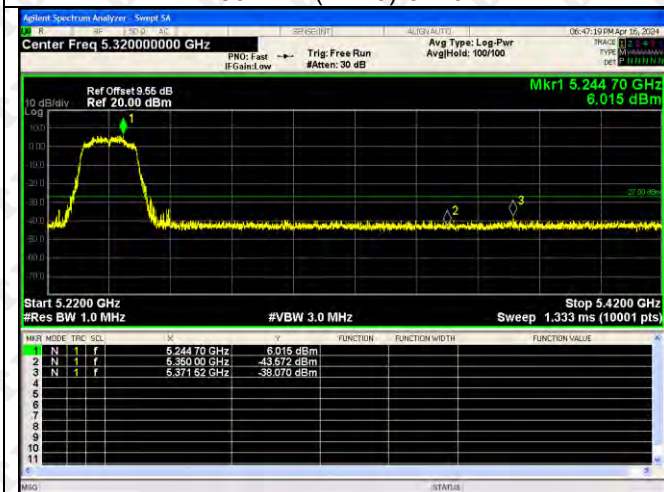




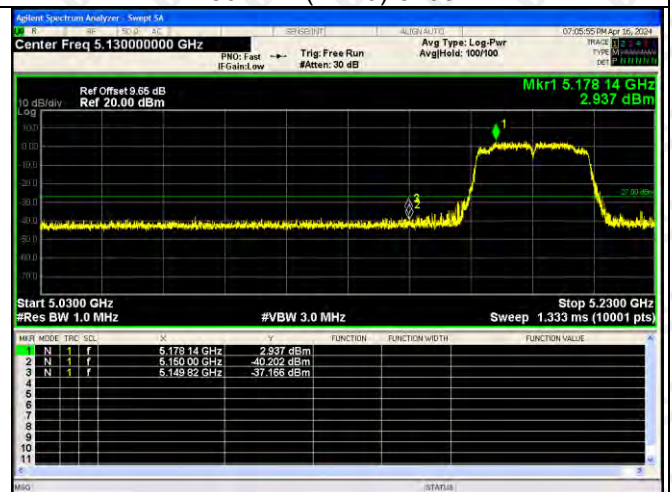
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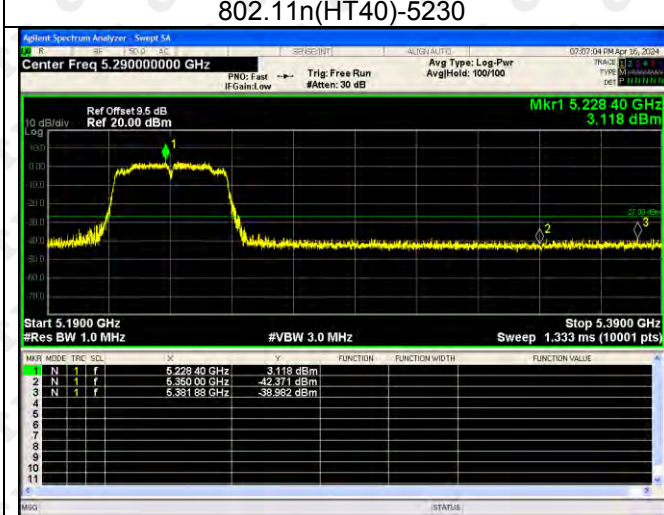
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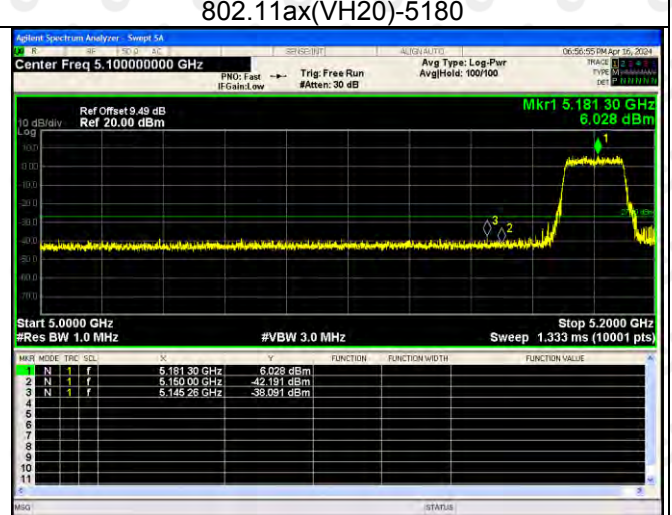
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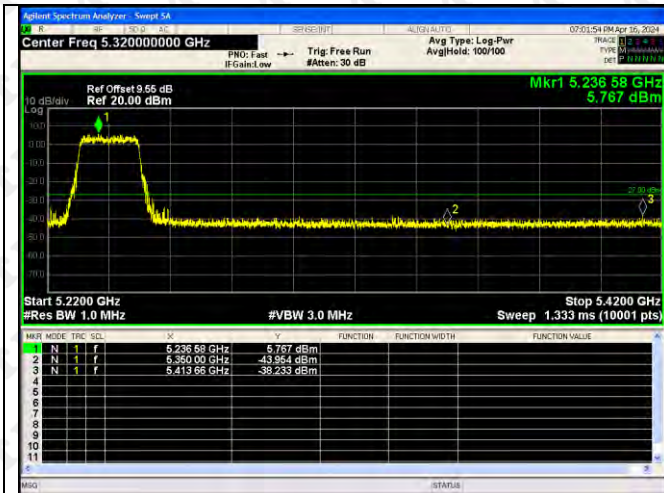
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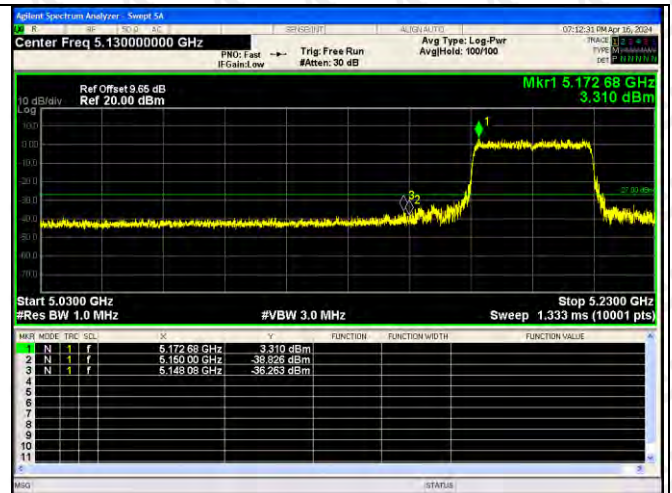
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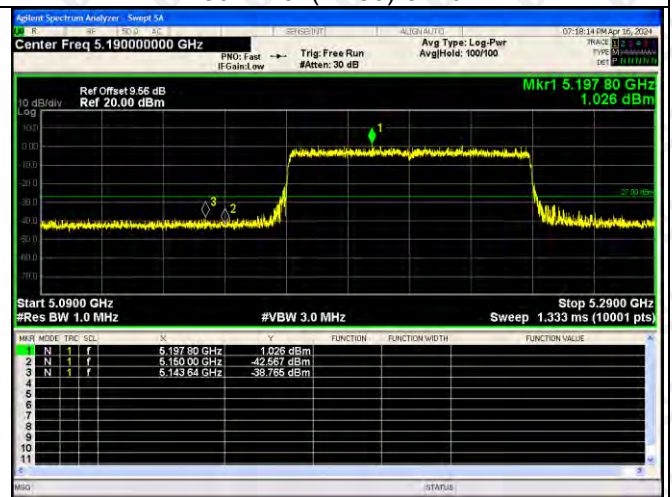
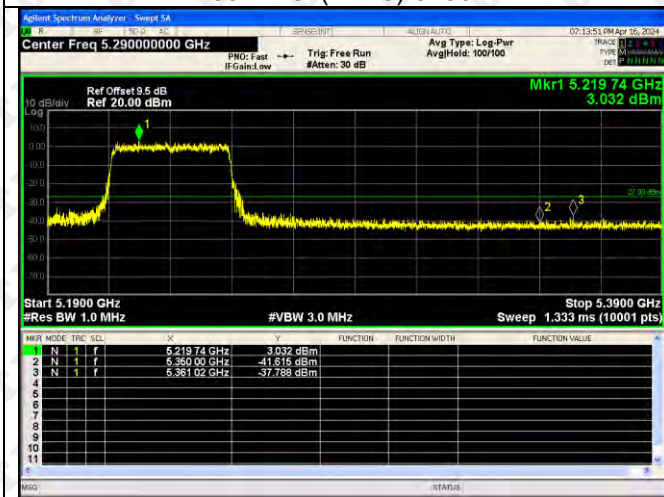
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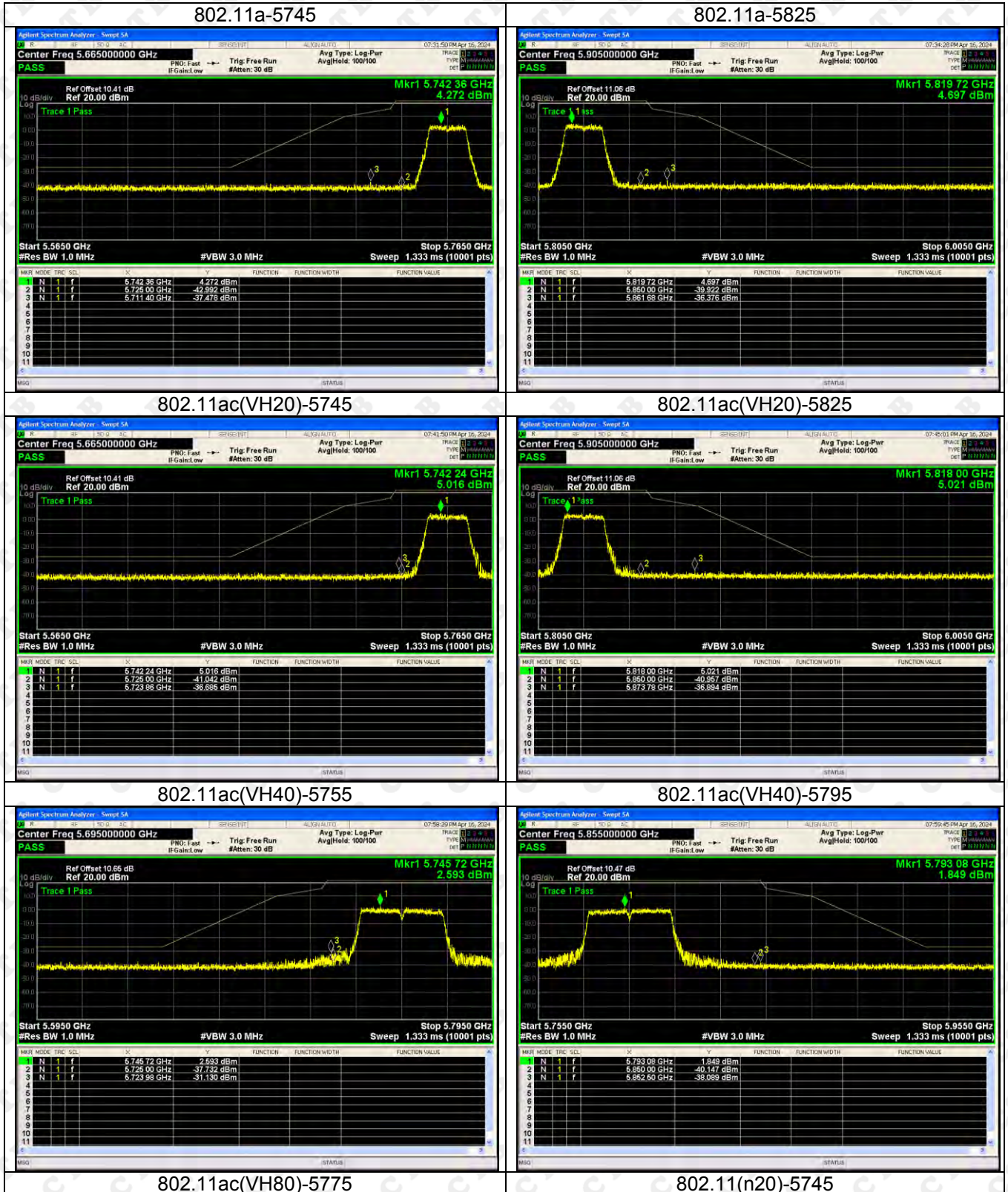


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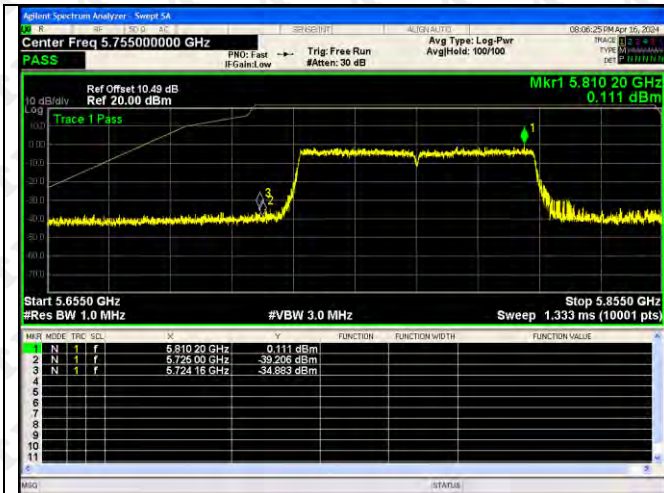




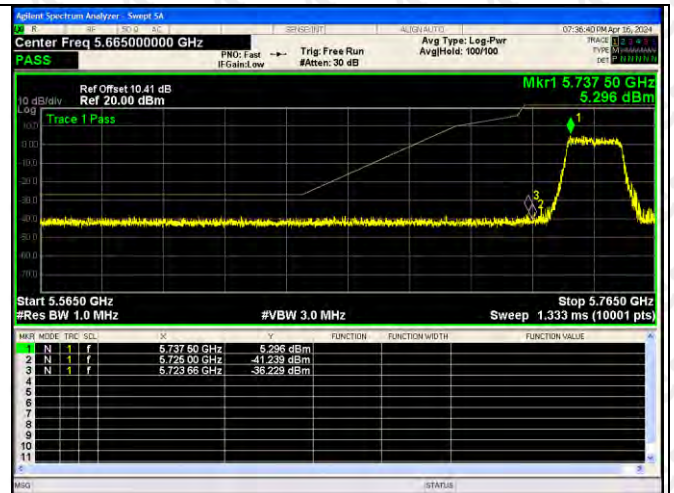
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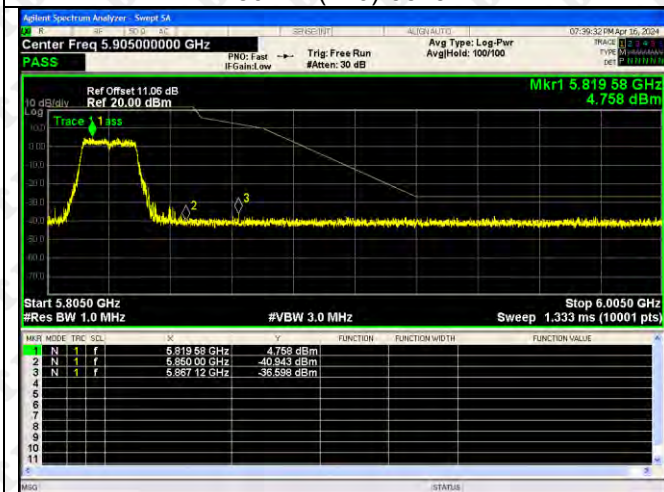




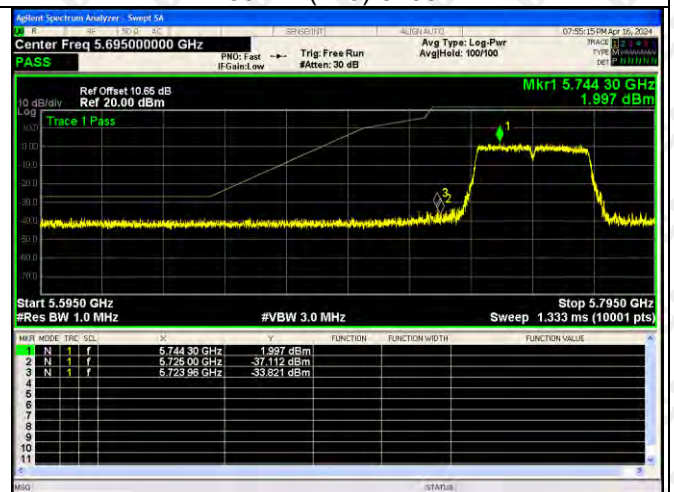
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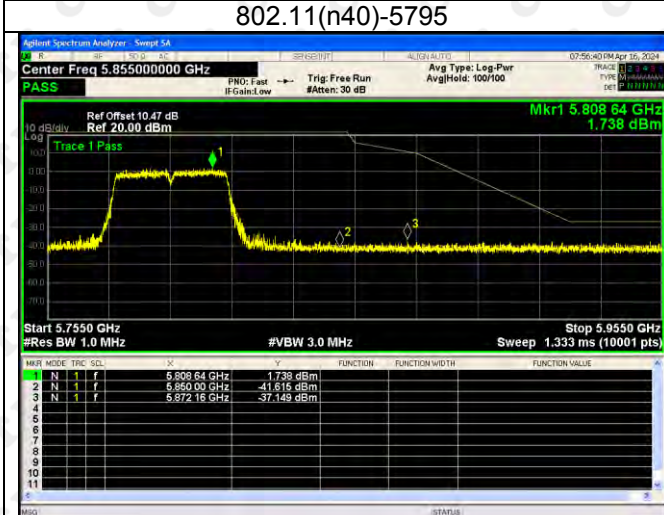
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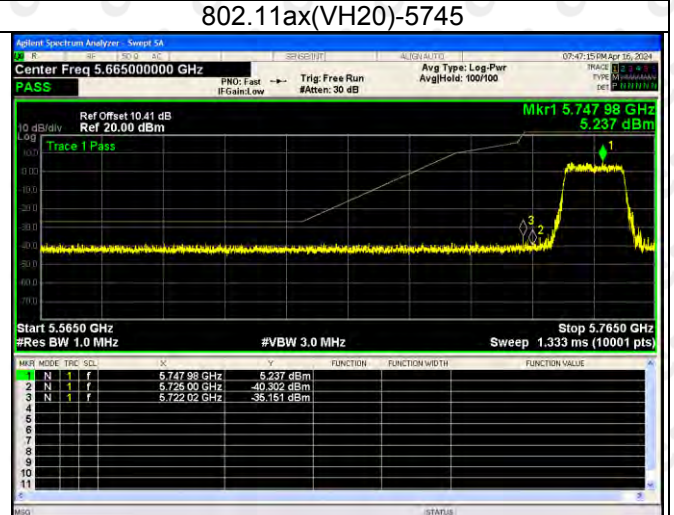
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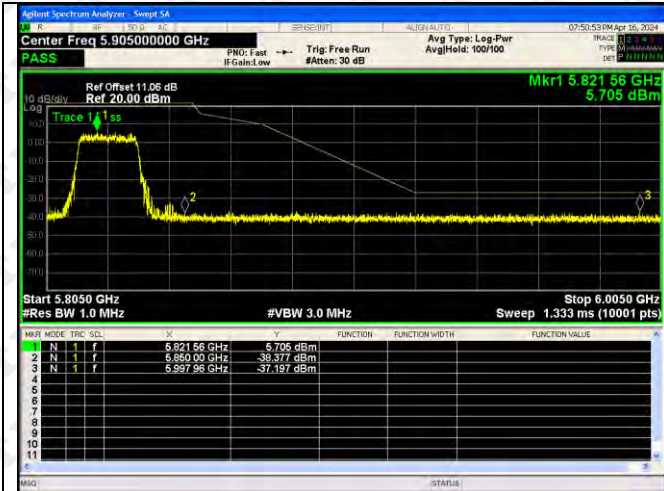
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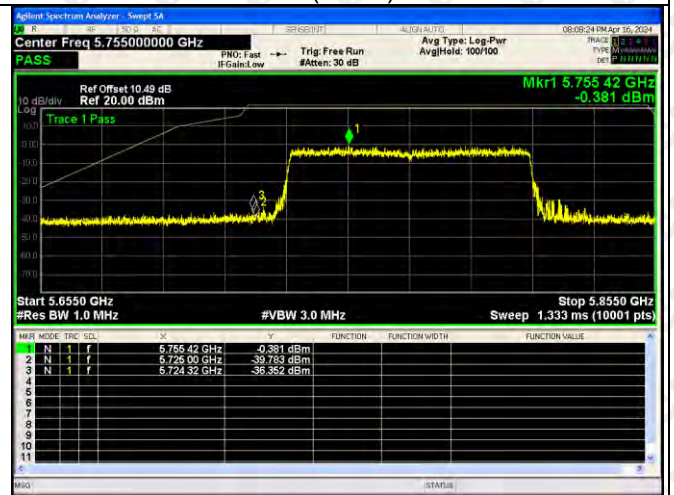
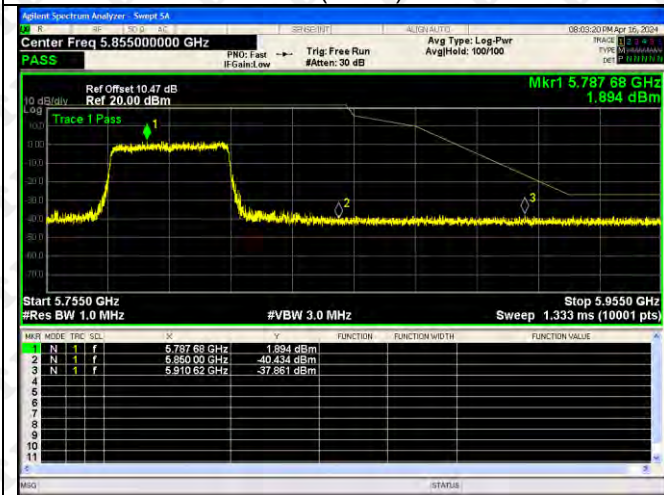
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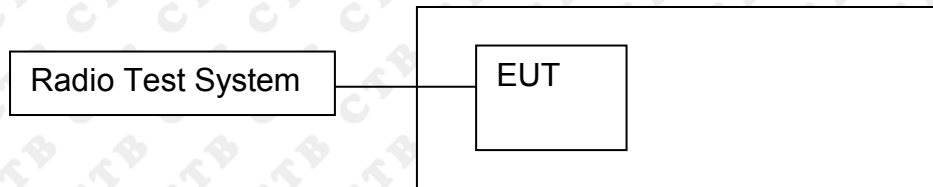
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## 9. CONDUCTED OUTPUT POWER

### 9.1 Block Diagram Of Test Setup



### 9.2 Limit

(1) For the band 5.15-5.25 GHz.

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p.

at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or  $11 \text{ dBm} + 10 \log B$ , where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(4) The maximum conducted output power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage.

(5) The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements in the 5.725-5.85 GHz band are made over a reference bandwidth of 500 kHz or the 26 dB emission bandwidth of the device, whichever is less. Measurements in the 5.15-5.25 GHz, 5.25-5.35 GHz, and the 5.47-5.725 GHz bands are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A narrower resolution



bandwidth can be used, provided that the measured power is integrated over the full reference bandwidth.

(h) Transmit Power Control (TPC) and Dynamic Frequency Selection (DFS).

(1) Transmit power control (TPC). U-NII devices operating in the 5.25-5.35 GHz band and the 5.47-5.725 GHz band shall employ a TPC mechanism. The U-NII device is required to have the capability to operate at least 6 dB below the mean EIRP value of 30 dBm. A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW.

### 9.3 Test procedure

According to KDB789033 D02v02r01 sectionE, the following is the measurement procedure.

(i) Set span to encompass the entire emission bandwidth (EBW) (or, alternatively, the entire 99% occupied bandwidth) of the signal.

(ii) Set RBW = 1 MHz.

(iii) Set VBW  $\geq$  3 MHz.

(iv) Number of points in sweep  $\geq 2 \times \text{span} / \text{RBW}$ . (This ensures that bin-to-bin spacing is  $\leq \text{RBW}/2$ , so that narrowband signals are not lost between frequency bins.)

(v) Sweep time = auto.

(vi) Detector = power averaging (rms), if available. Otherwise, use sample detector mode.

(vii) If transmit duty cycle  $< 98\%$ , use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle  $\geq 98\%$ , and if each transmission is entirely at the maximum power control level, then the trigger shall be set to "free run."

(viii) Trace average at least 100 traces in power averaging (rms) mode.

(ix) Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument's band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the spectrum.

## 9.4 Test Result

## ANT 1+ANT 2

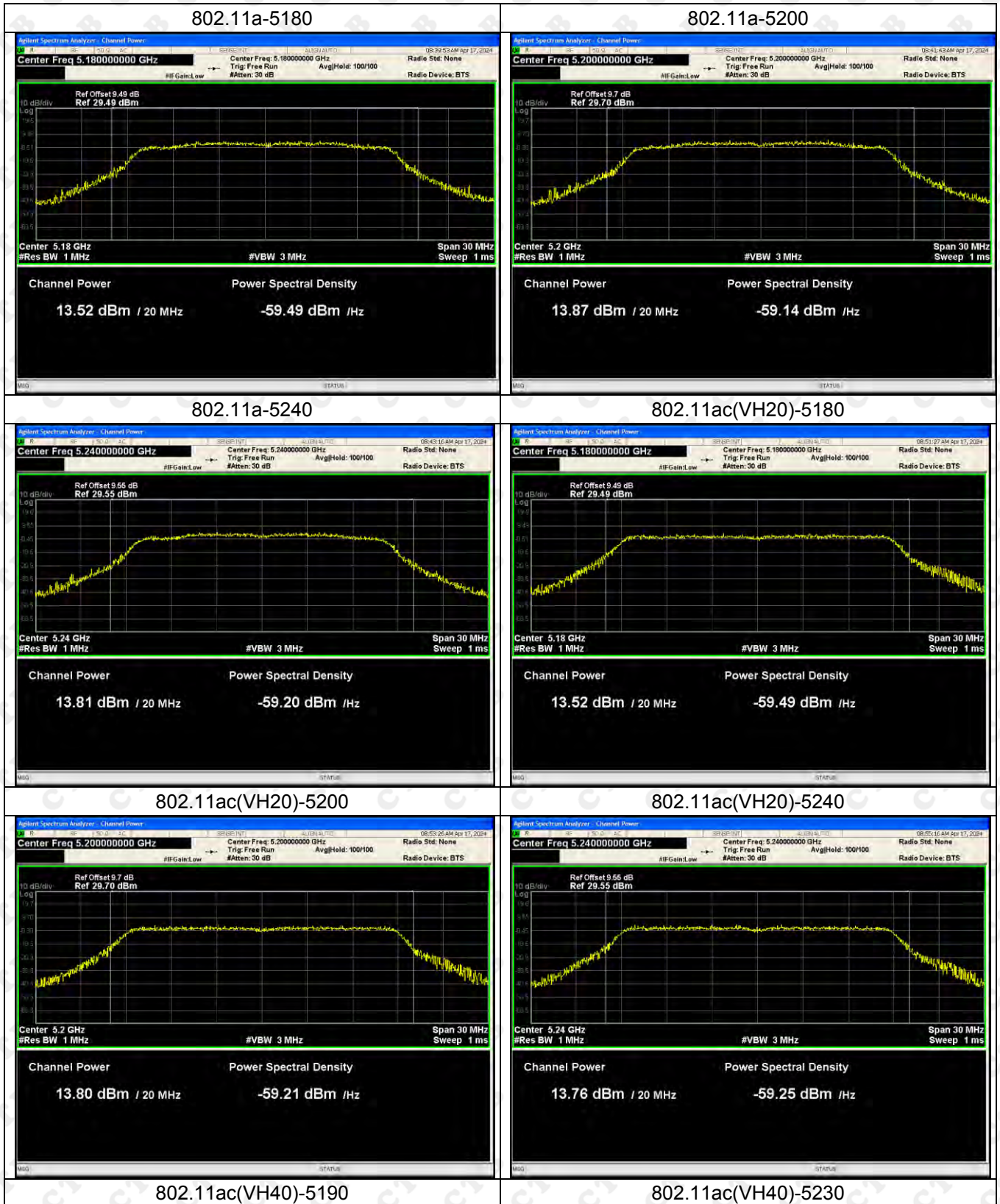
Test mode1	Test Channel (MHz)	Output Power dBm ANT1	Output Power dBm ANT2	Output Power dBm Total	Limit dBm
802.11a	5180	13.522	12.976	/	23.98
	5200	13.868	13.231	/	23.98
	5240	13.807	12.952	/	23.98
802.11ac20	5180	13.52	13.108	16.329	23.98
	5200	13.799	13.318	16.575	23.98
	5240	13.76	13.185	16.492	23.98
802.11ac40	5190	13.246	13.397	16.332	23.98
	5230	12.417	13.163	15.816	23.98
802.11ac80	5210	13.878	13.366	16.640	23.98
802.11n(HT20)	5180	13.44	12.971	16.222	23.98
	5200	13.665	13.324	16.508	23.98
	5240	13.768	13.134	16.473	23.98
802.11n(HT40)	5190	13.766	13.532	16.661	23.98
	5230	12.706	13.246	15.995	23.98
802.11ax20	5180	13.998	13.692	16.858	23.98
	5200	14.345	13.919	17.148	23.98
	5240	14.285	13.726	17.025	23.98
802.11ax40	5190	13.577	13.791	16.696	23.98
	5230	13.688	13.499	16.605	23.98
802.11ax80	5210	14.119	13.666	16.909	23.98

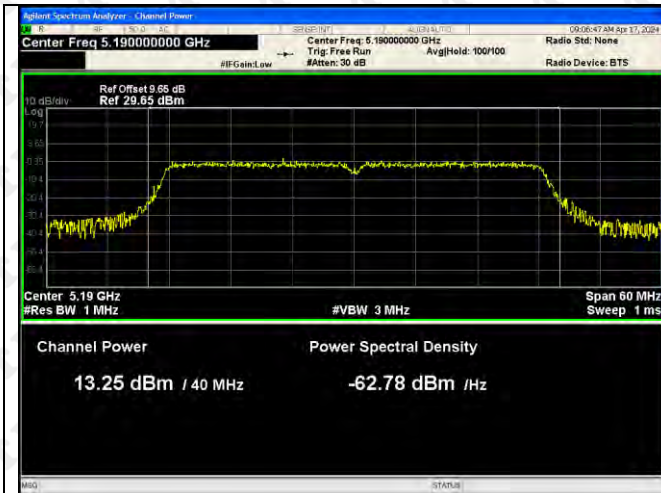
## ANT 1+ANT 2

Test mode1	Test Channel (MHz)	Output Power dBm ANT1	Output Power dBm ANT2	Output Power dBm Total	Limit dBm
802.11a	5745	13.509	12.377	/	30
	5785	13.33	11.456	/	30
	5825	14.282	12.434	/	30
802.11ac20	5745	13.601	12.183	15.960	30
	5785	13.094	11.851	15.527	30
	5825	13.798	12.766	16.323	30
802.11ac40	5755	13.309	12.56	15.961	30
	5795	13.36	12.452	15.940	30
802.11ac80	5775	13.441	12.558	16.032	30
802.11n(HT20)	5745	13.751	12.07	16.002	30
	5785	13.573	11.75	15.767	30
	5825	14.426	12.646	16.637	30
802.11n(HT40)	5755	13.396	12.507	15.985	30
	5795	13.447	12.425	15.976	30
802.11ax20	5745	13.147	12.838	16.006	30
	5785	12.874	12.522	15.712	30
	5825	13.958	13.419	16.707	30
802.11ax40	5755	13.265	12.755	16.028	30
	5795	13.327	12.819	16.091	30
802.11ax80	5775	13.417	12.938	16.194	30

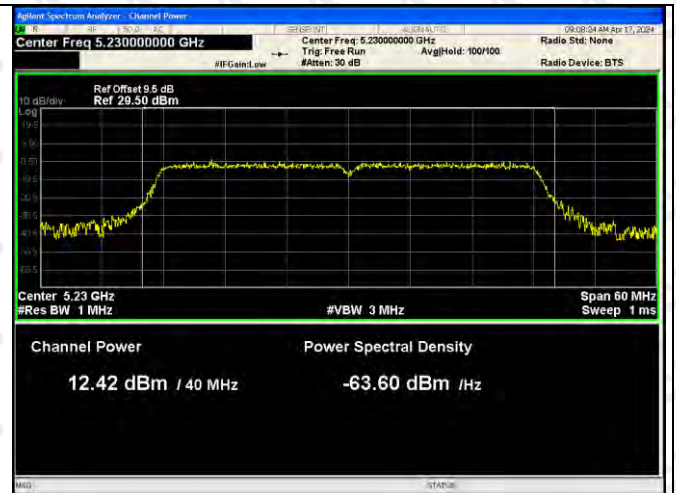


ANT 1

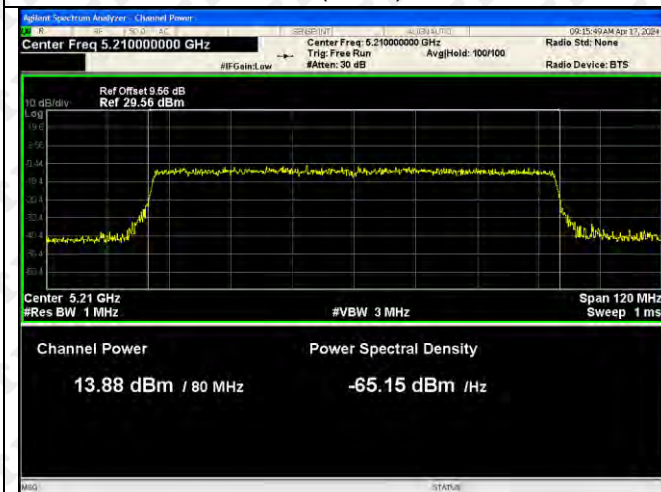




802.11ac(VH80)-5210



802.11n(HT20)-5180



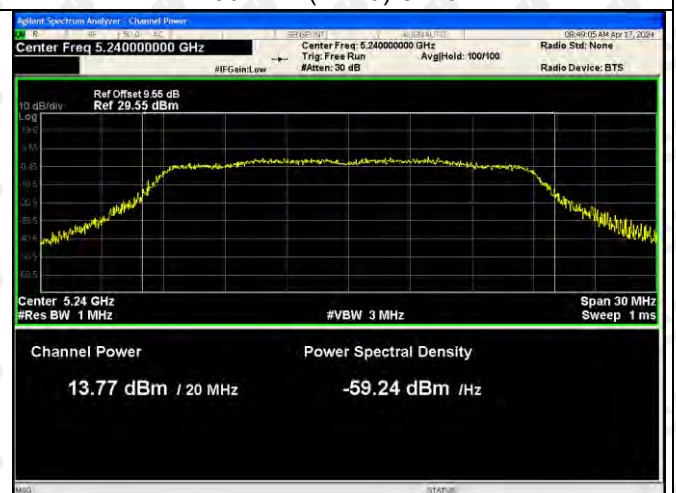
802.11n(HT20)-5200



802.11n(HT20)-5240

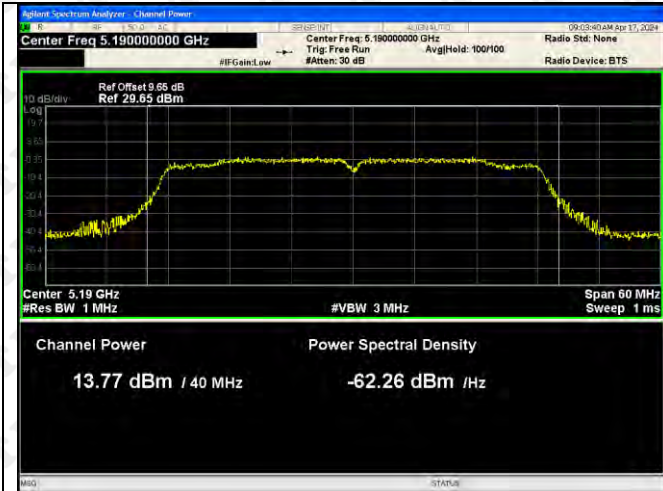


802.11n(HT40)-5190

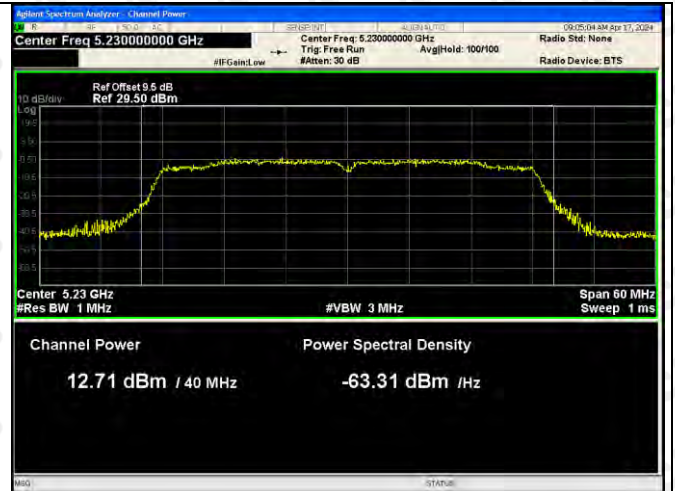


802.11n(HT40)-5230

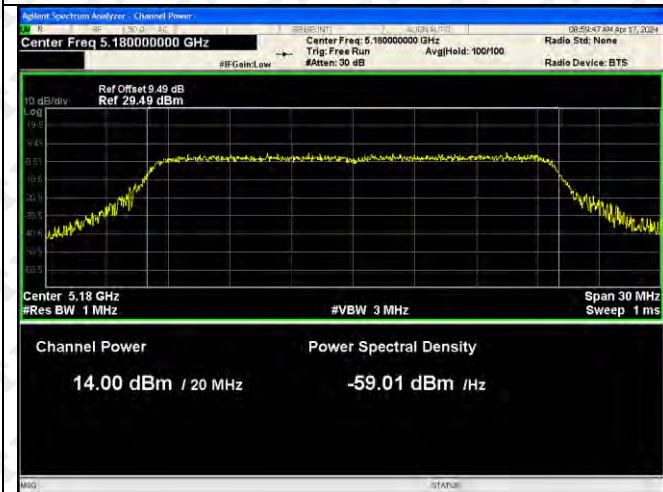




802.11ax(VH20)-5180



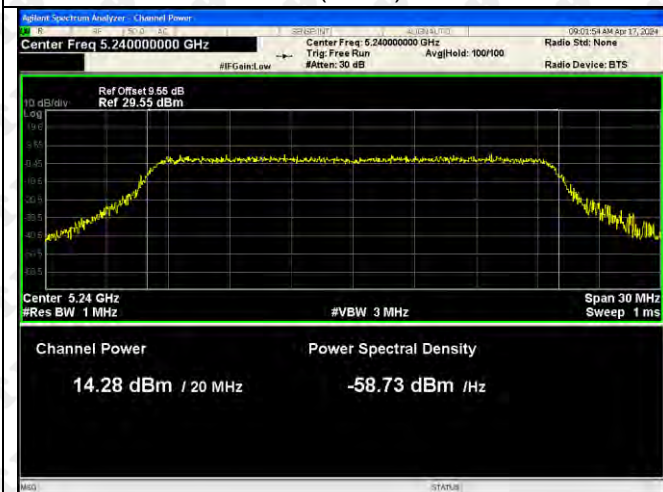
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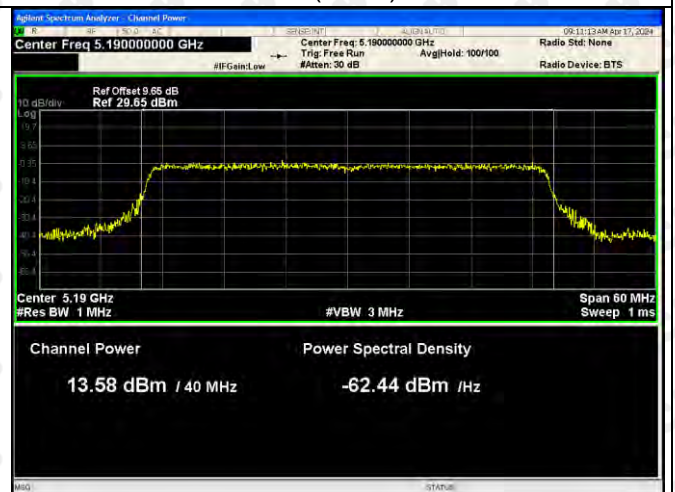
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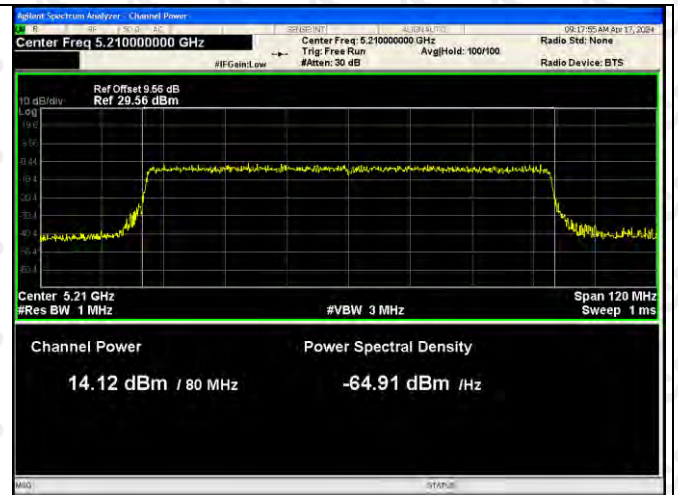
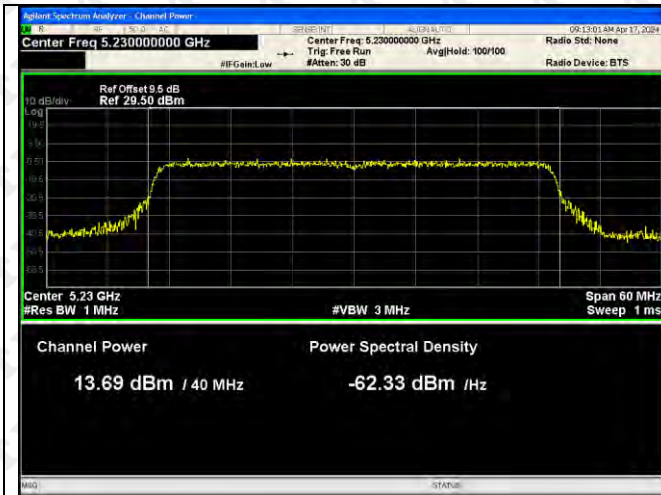
802.11ax(VH40)-5190



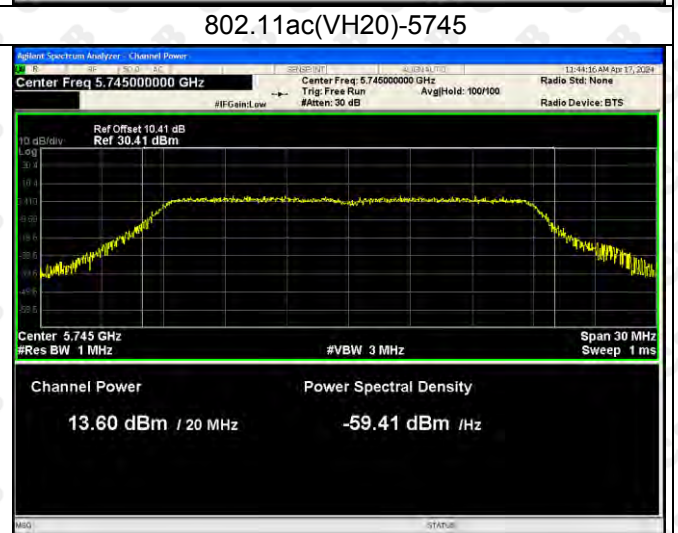
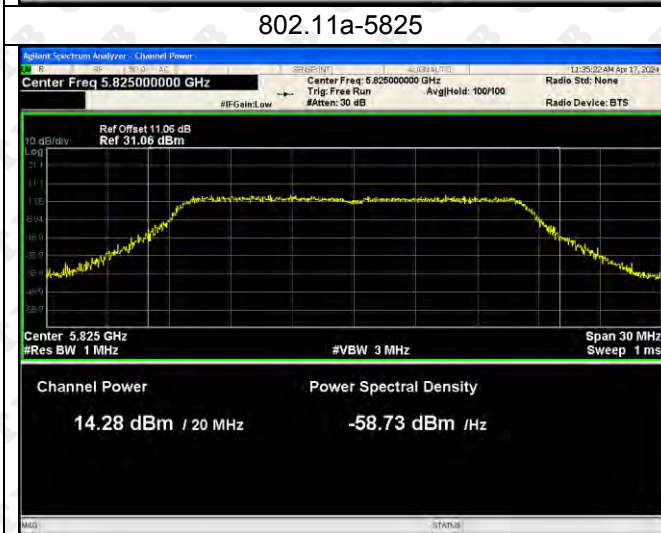
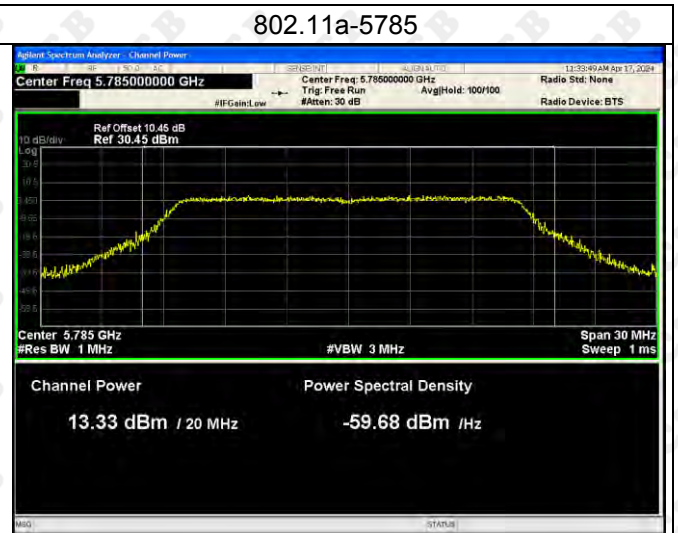
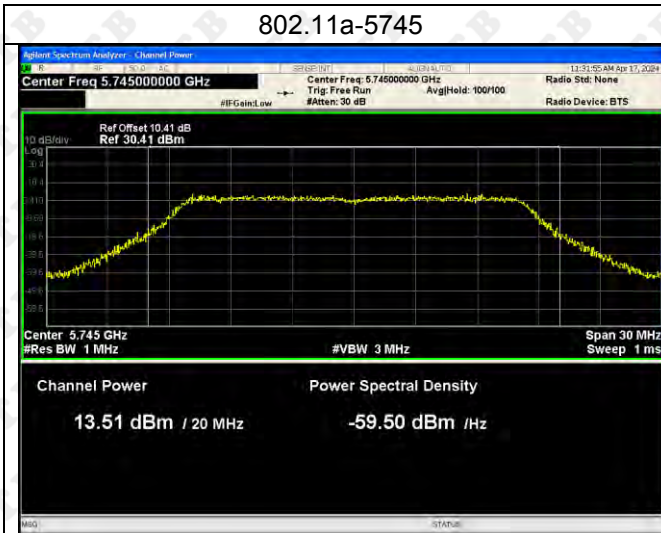
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802.11ax(VH80)-5210



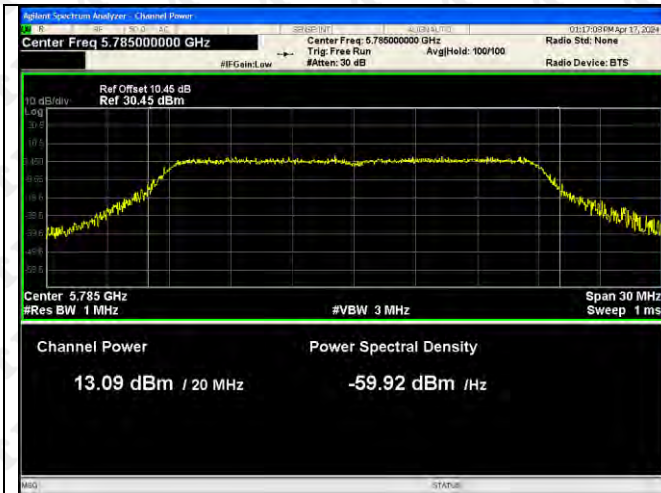
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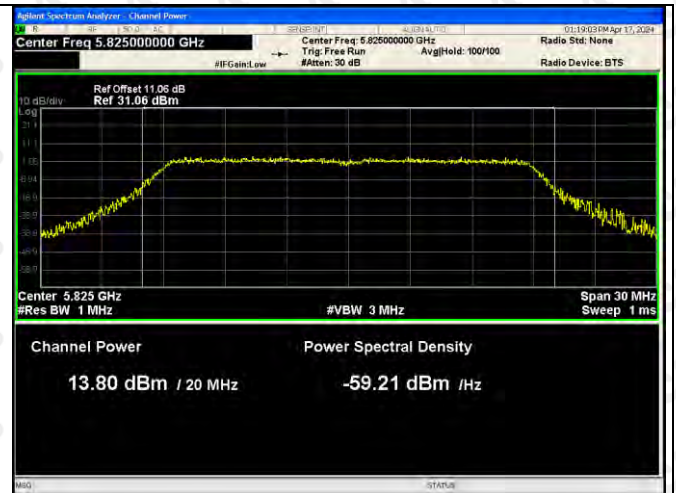
802.11ac(VH20)-5785

802.11ac(VH20)-5825

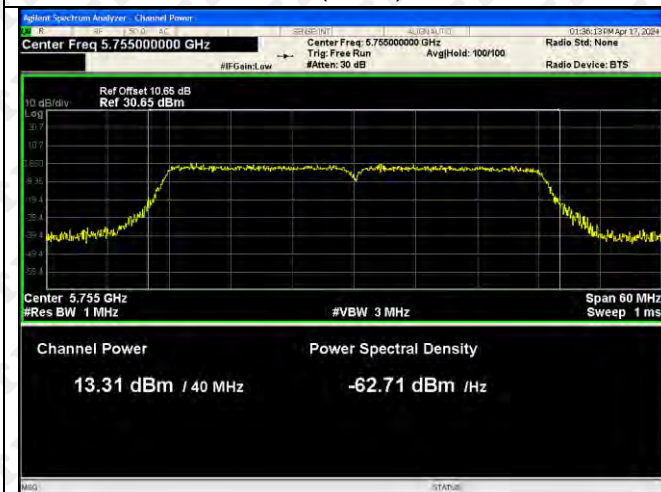




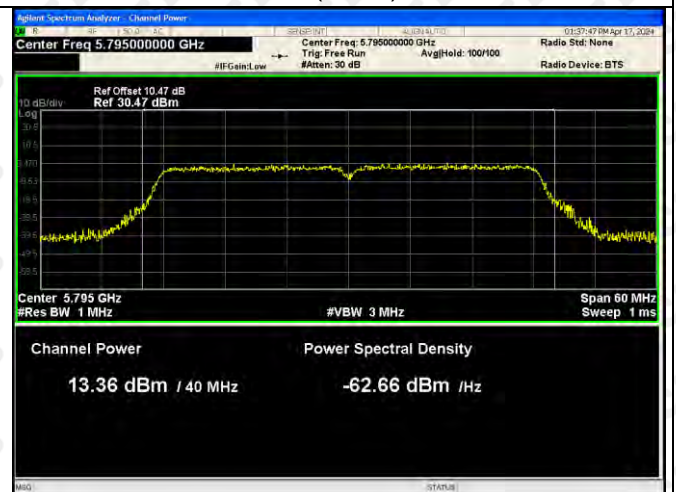
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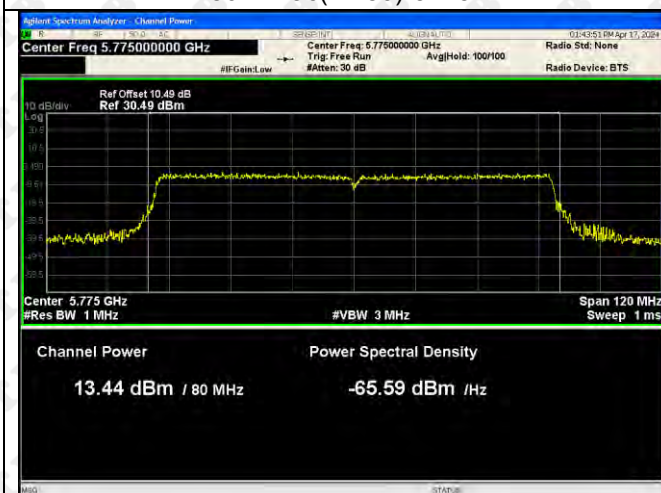
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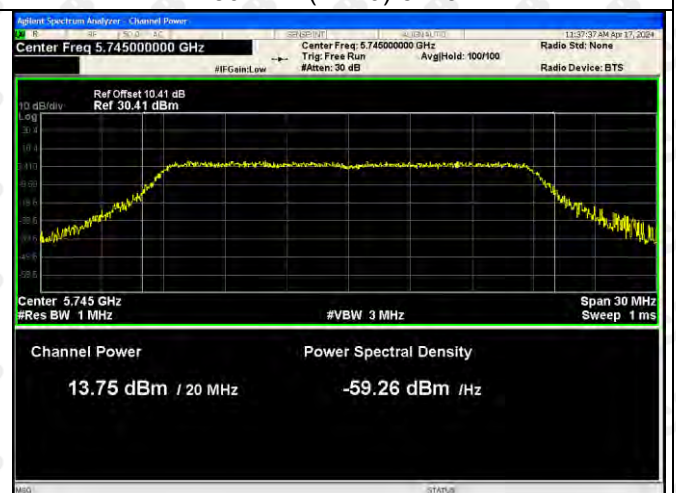
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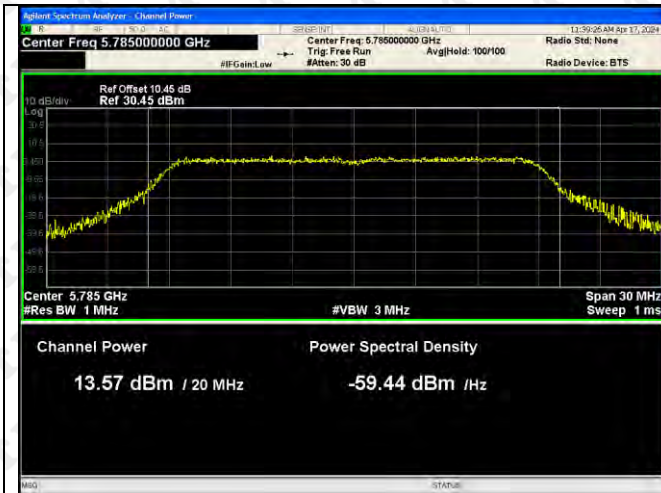
802.11n(HT20)-5745



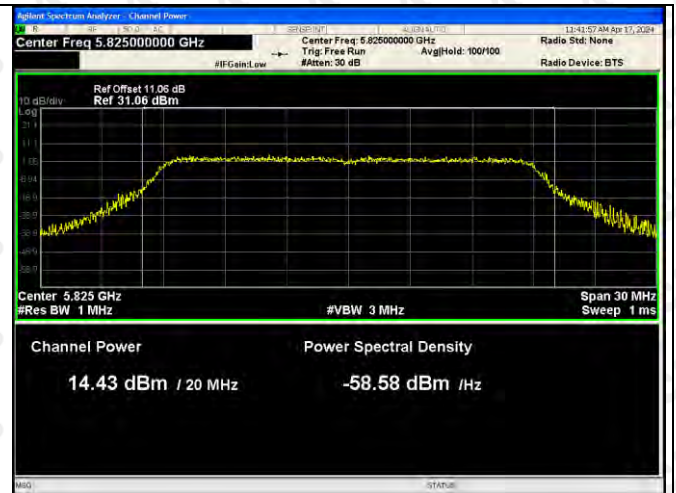
802.11n(HT20)-5785



802.11n(HT20)-5825



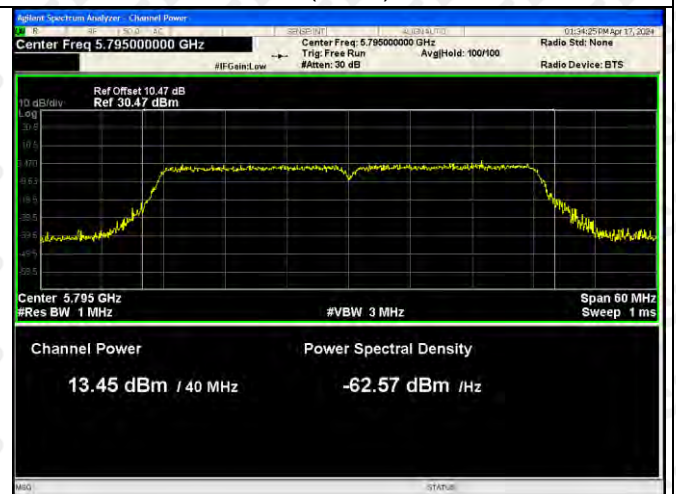
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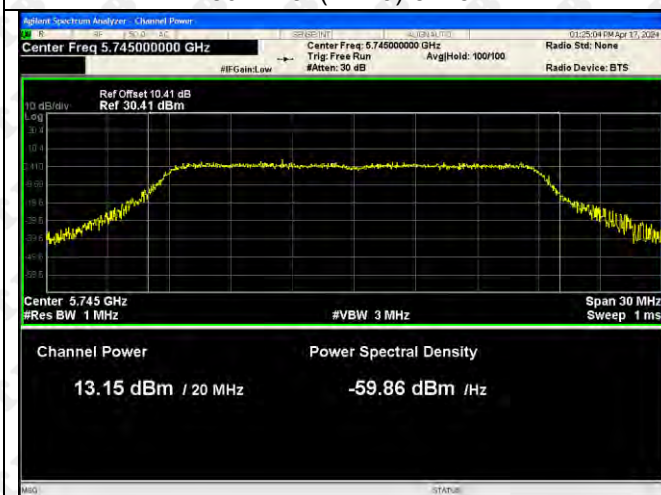
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802.11ax(VH20)-5745



802.11ax(VH20)-5785

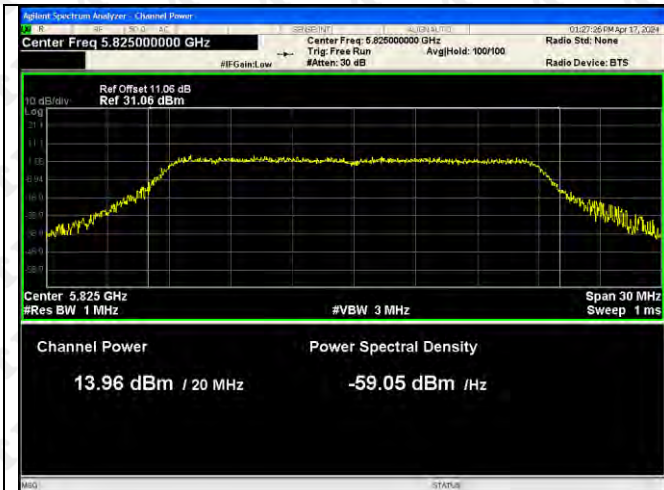


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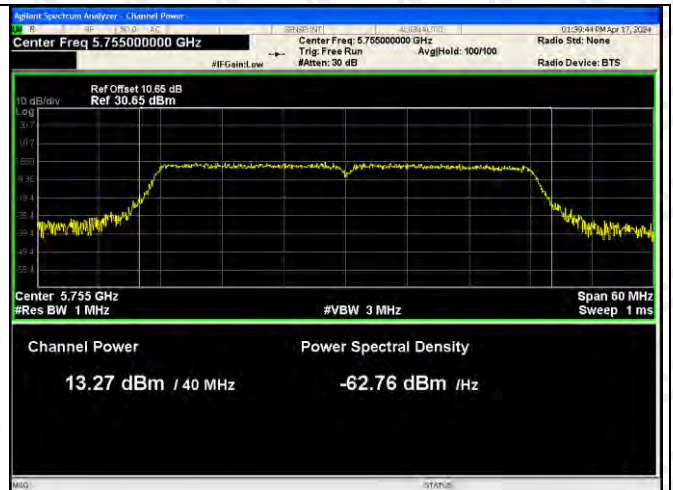


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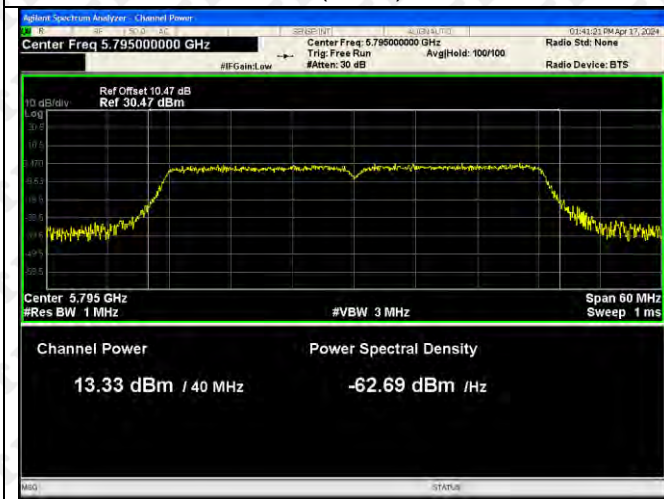




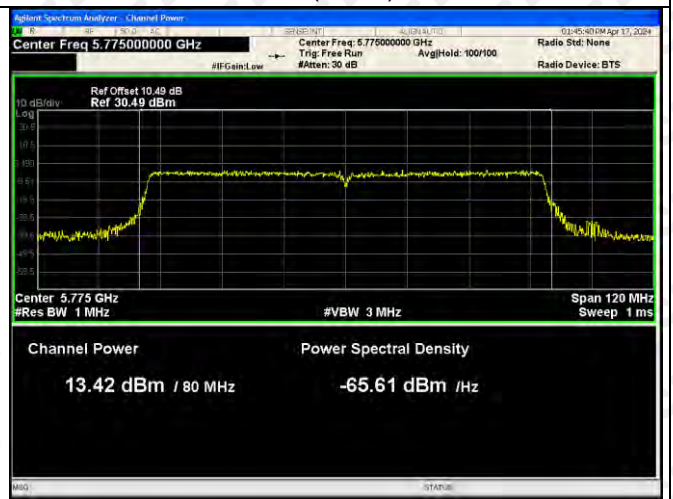
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802.11ax(VH80)-5775

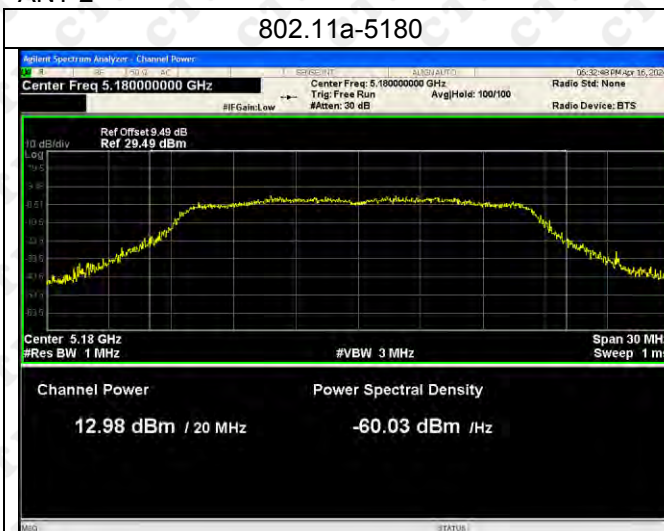


802.11a-5180



802.11a-5200

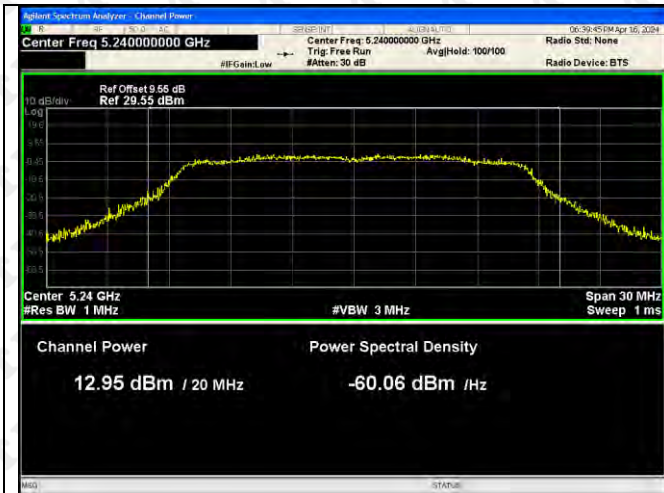
ANT 2



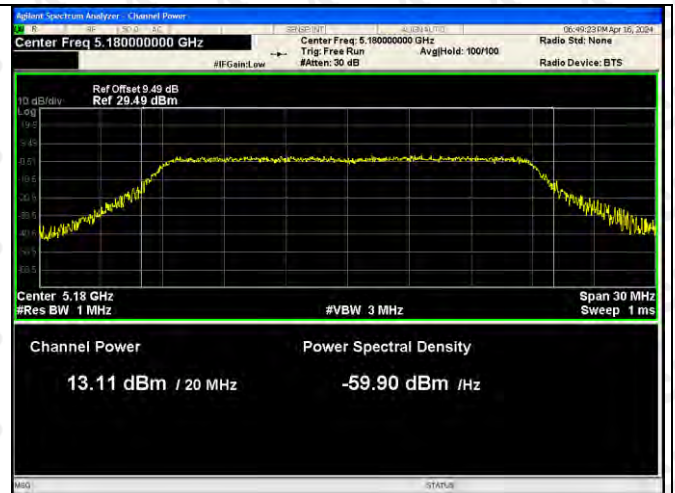
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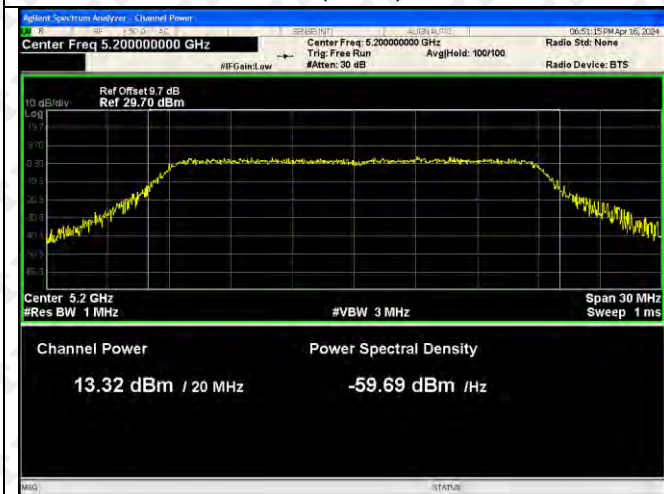
802.11ac(VH20)-5180



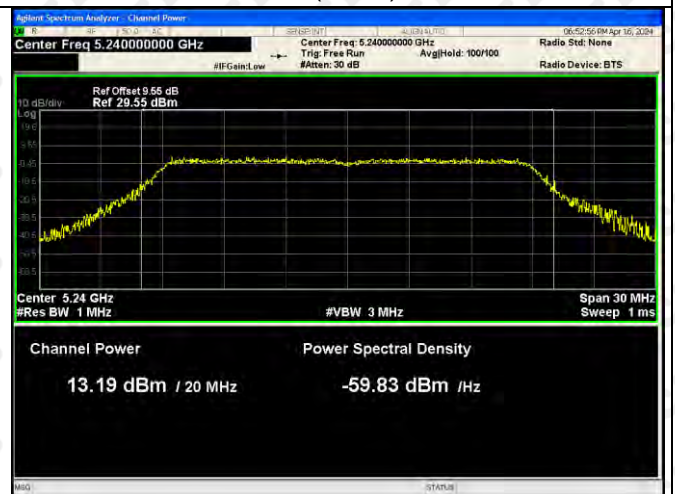
802.11ac(VH20)-5200



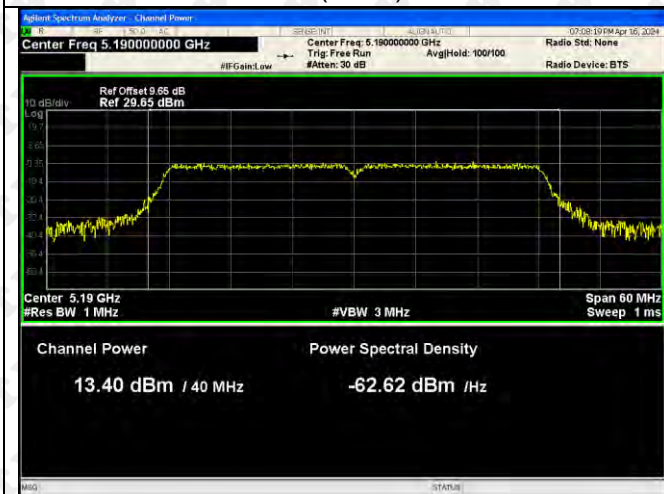
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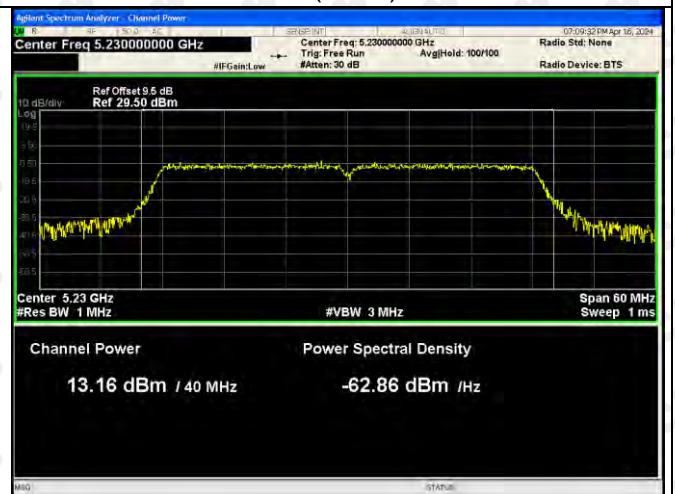
802.11ac(VH40)-5190



802.11ac(VH40)-5230

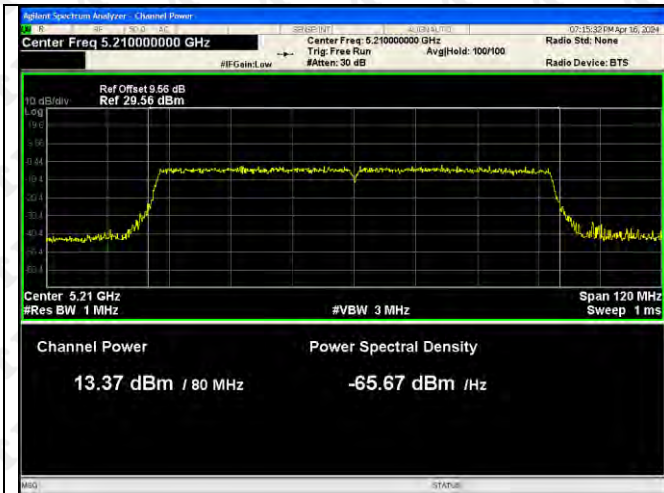


802.11ac(VH80)-5210

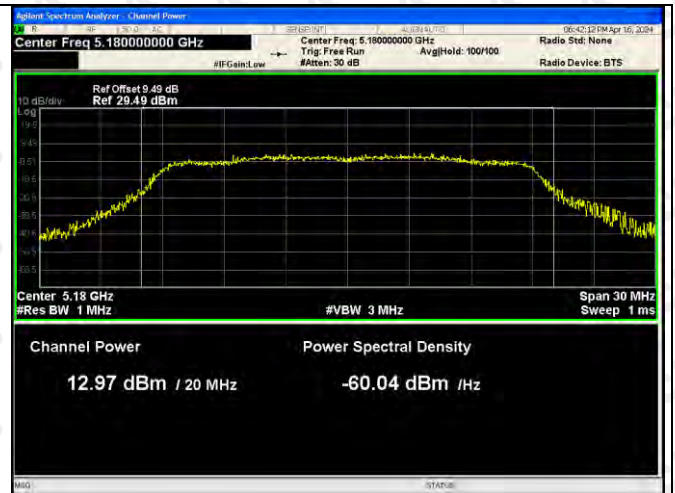


802.11n(HT20)-5180





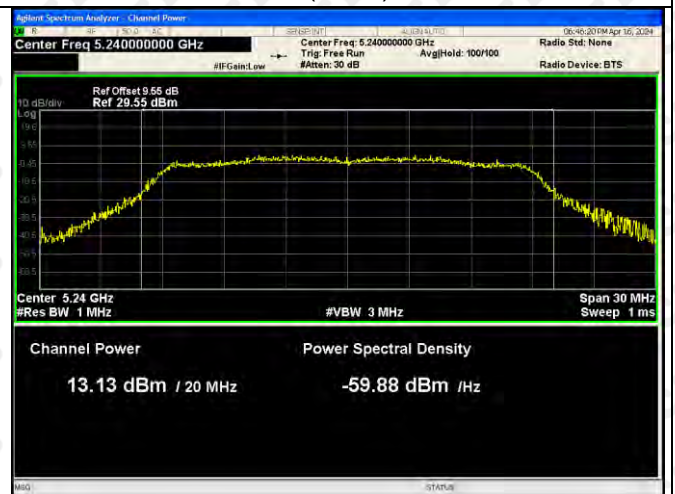
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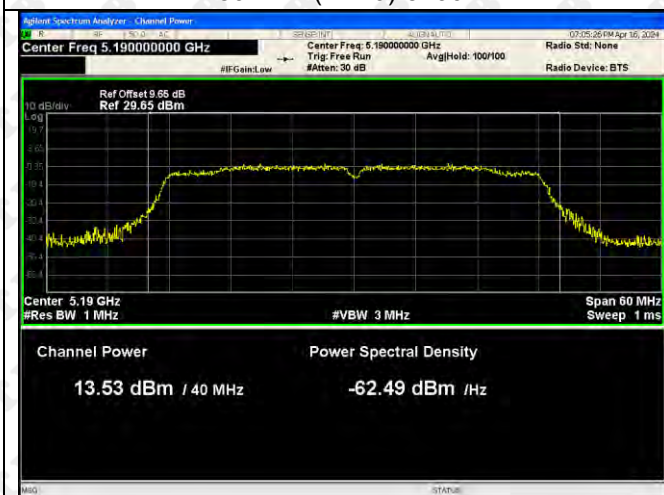
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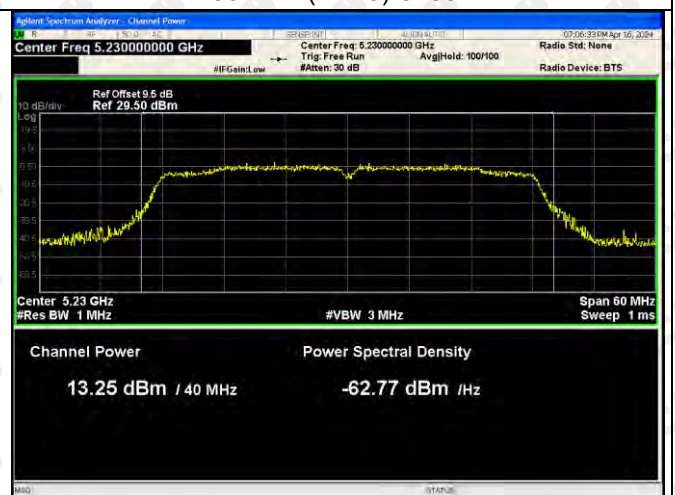
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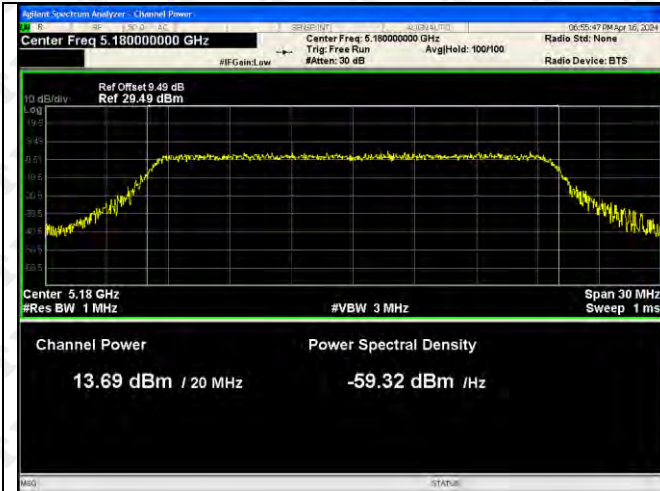
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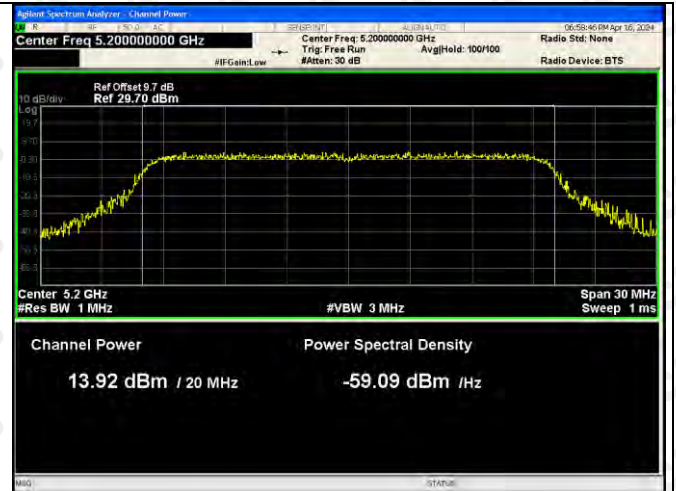
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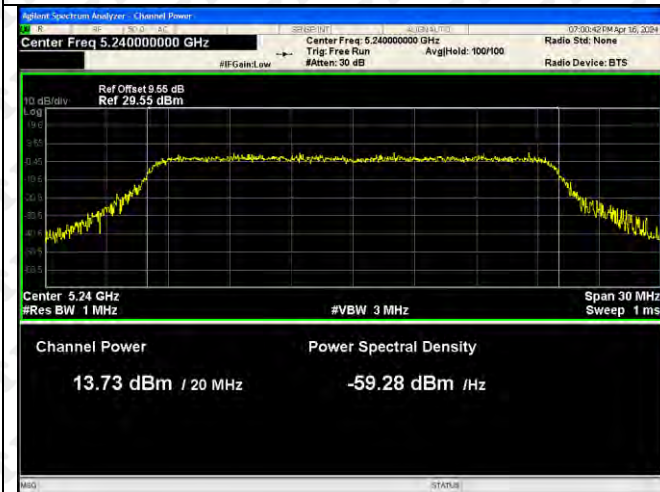
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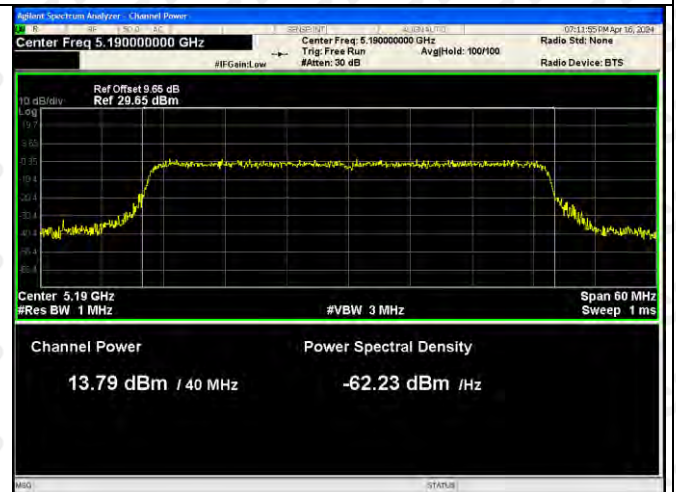
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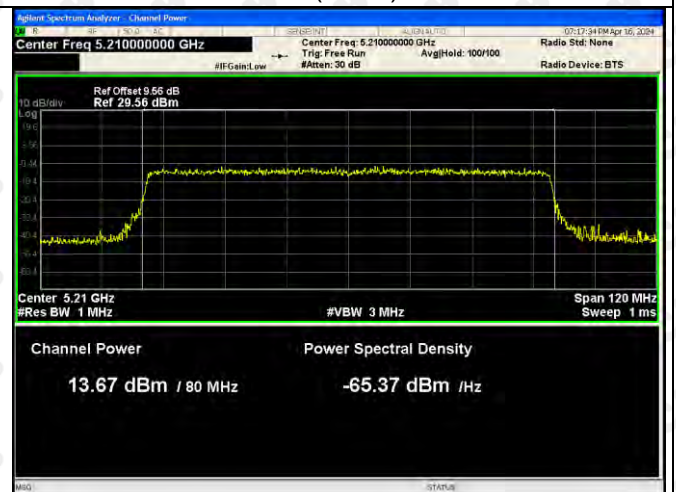
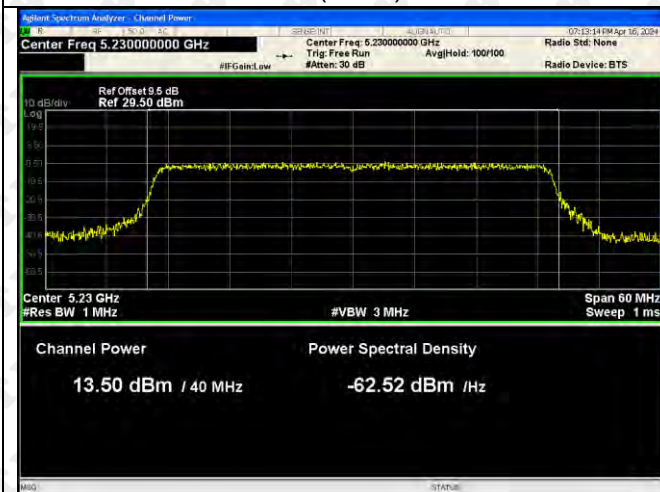
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802.11ax(VH40)-5230

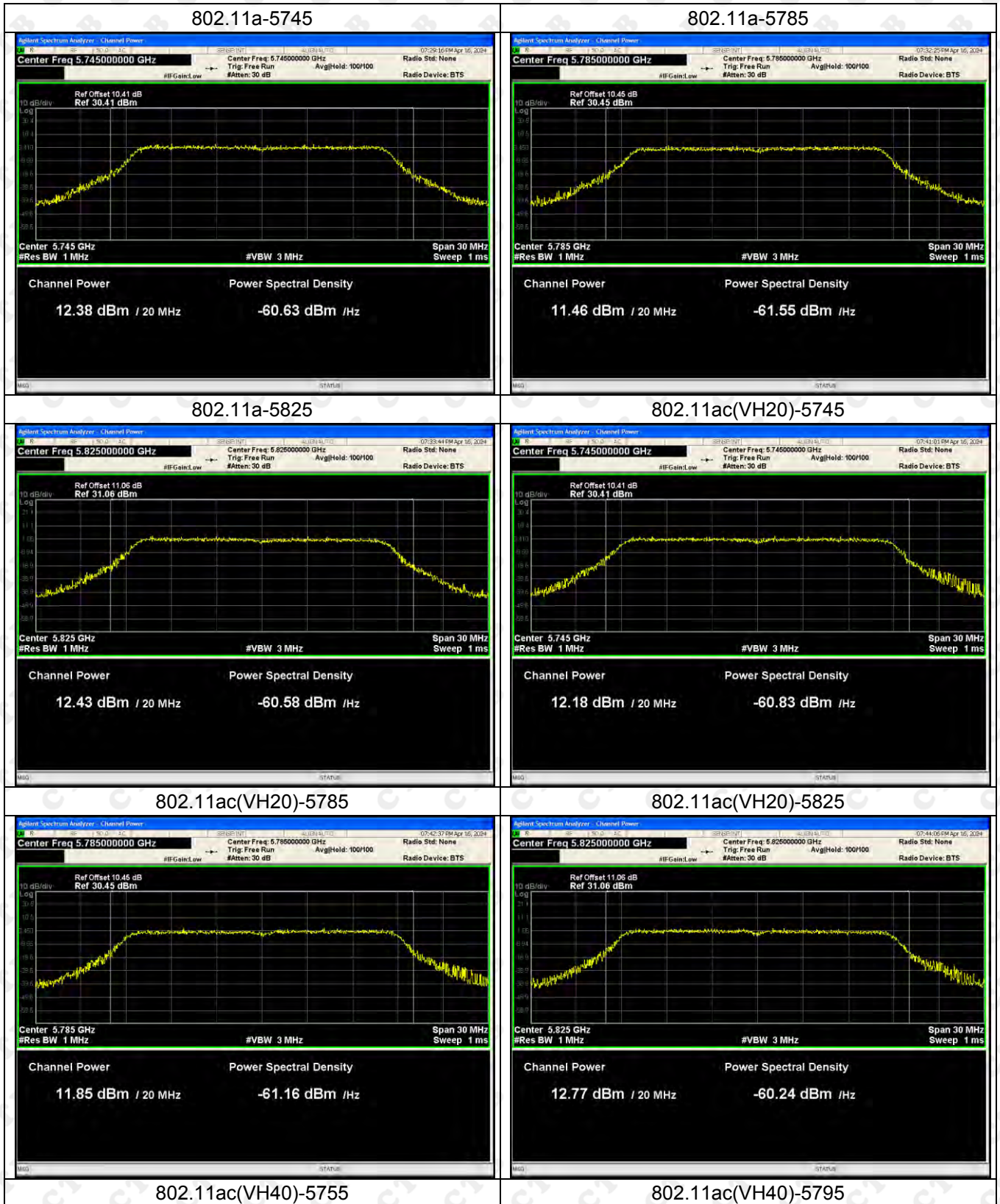


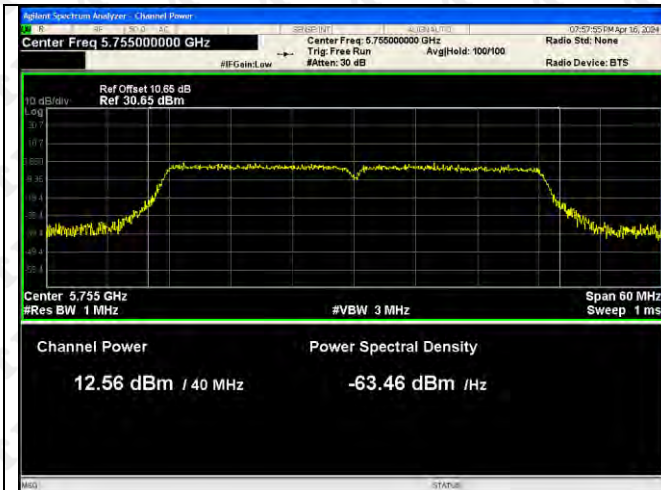
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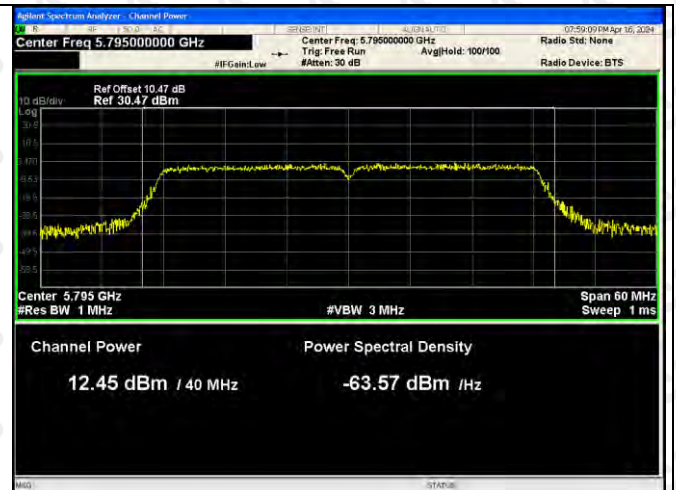


ANT2:

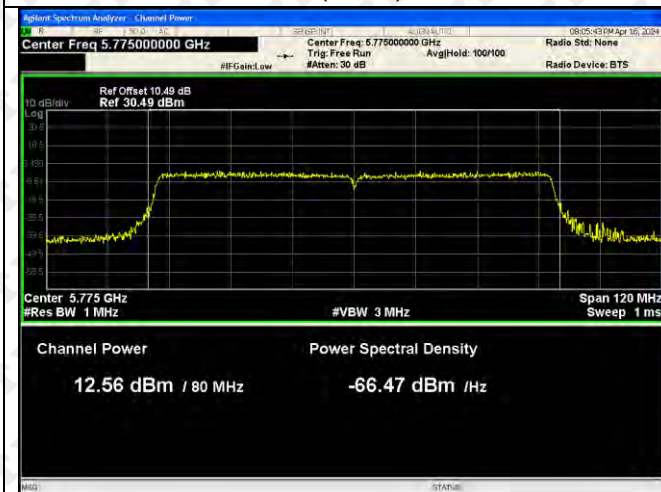




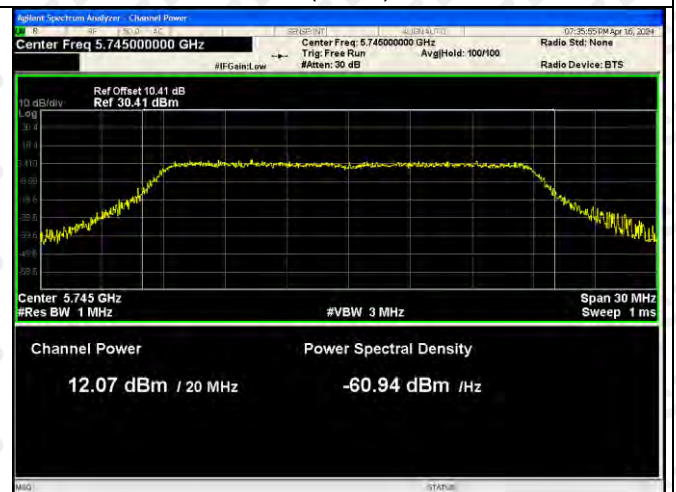
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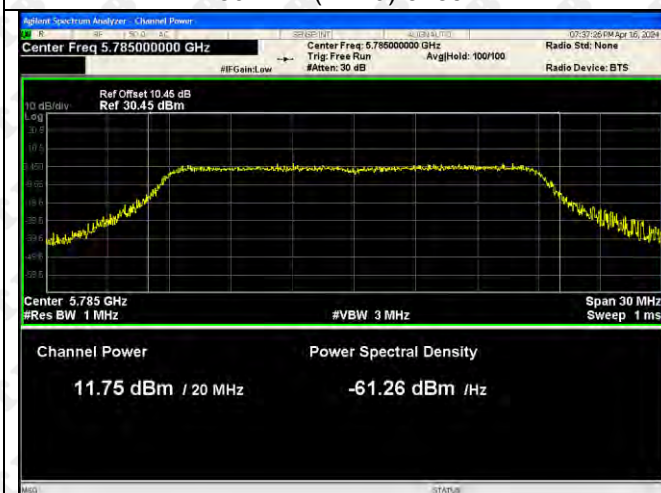
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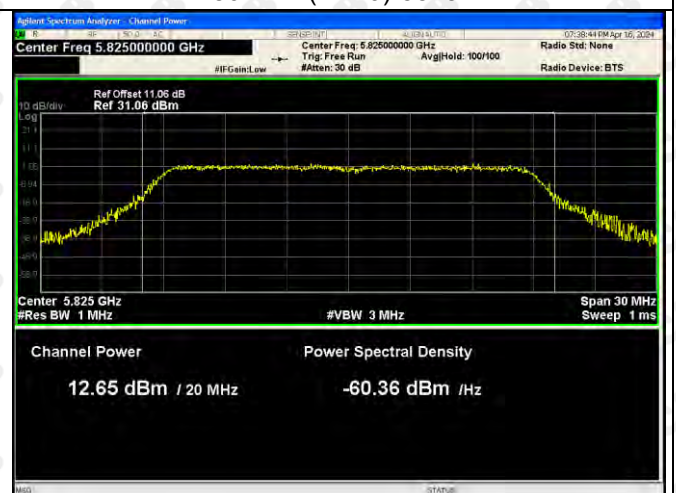
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802.11n(HT20)-5825

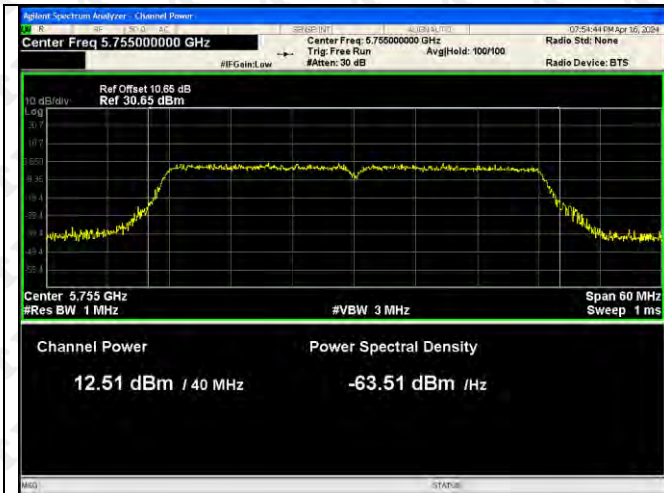


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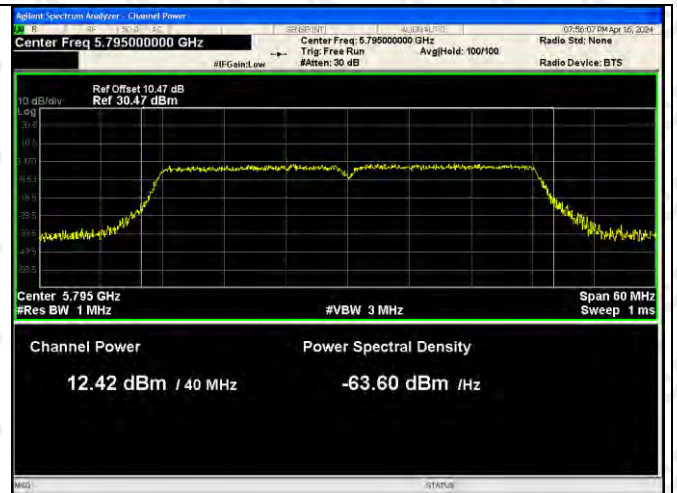


802.11n(HT40)-5795





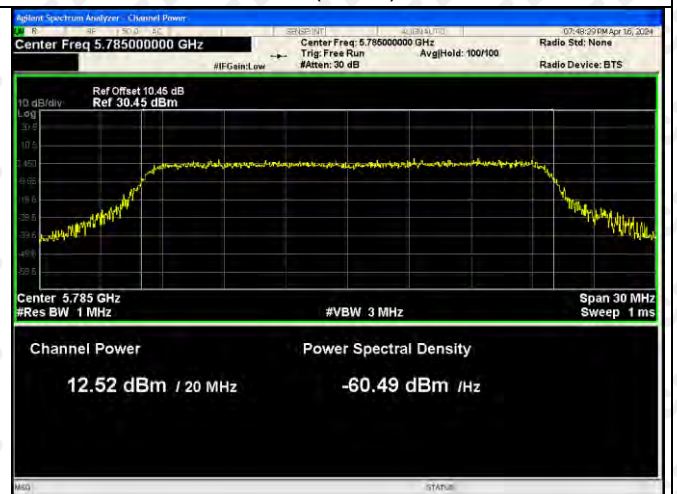
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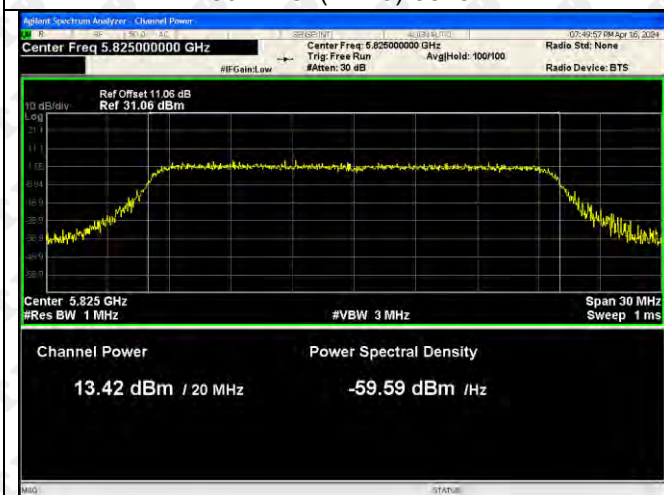
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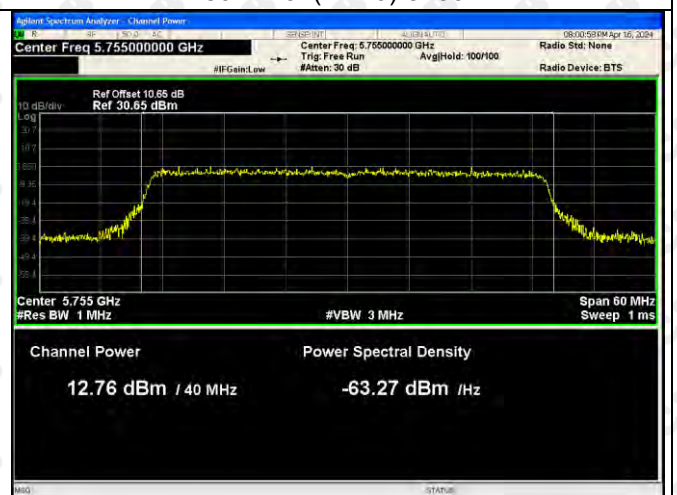
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802.11ax(VH40)-5755



802.11ax(VH40)-5795



802.11ax(VH80)-5775

